



## FREQUENTLY ASKED QUESTIONS

This list of frequently asked questions has been divided into four sections: General questions on Internet voting, questions on security and access issues and questions that administrators might have about how the VoteHere.net system will work in their environment.

### General

#### What is Internet voting?

Internet voting is simply another way to cast a vote. Just as anyone can vote at a poll-site using a punch-card system or direct recording device or use the U.S. Postal Service to send an absentee ballot, Internet voting is another option available to registered voters.

There are two types of Internet voting systems: **poll-site Internet voting** and **remote Internet voting**. Poll-site Internet voting is characterized by the use of Internet-connected personal computers located at traditional polling locations, schools, and libraries. In this case, Internet voting is simply an alternative system to existing poll-site equipment. Remote Internet voting, on the other hand, is where you vote from anywhere an Internet connection can be established — home, work, retirement center, library, etc. As with all election equipment, Internet voting systems must be certified by state officials to ensure that stringent security requirements are met that protect the secrecy of your vote and the integrity of the election.

#### What are the benefits to Poll-site Internet Voting?

Poll-site Internet voting provides greater access than current voting options. Today, a voter is assigned to a particular poll-site near their home. This is primarily done because it is cost prohibitive to provide all possible ballots at all poll-sites. With poll-site Internet voting, a voter can go to the poll-site in the county that is most convenient to them — whether it be near their home, workplace, or elsewhere in their area.

Because counties can use existing equipment (personal computers) located in public schools and libraries, there is a fairly low-cost path to opening new poll-sites. In addition, if the county is in the purchasing cycle for new poll-site equipment, they now have the option of purchasing low-cost personal computers rather than expensive, specialized election equipment. These new computers could be placed in libraries, schools, retirement centers, and social service agencies with the stipulation that they be available to all registered voters on election days. This not only provides a valuable service to the community, it also reduces storage costs, and creates more poll-sites in locations convenient to all.

#### How does the VoteHere.net Election System work?

Voters are authenticated either by poll workers at a poll-site or in the same manner that mail-in or absentee voting is done today — through a voter declaration form submitted to the county prior to the election. Once authenticated, the registered voter is provided with a digital certificate, typically stored on a floppy disk, to be used

When the voter is ready to cast their ballot, they access an Internet-connected computer (either at the poll-site or remotely) and enter the VoteHere.net election website. The voter will be prompted for personal identification as well as their digital certificate. Once the system acknowledges that the voter is eligible to vote, the voter is presented with a personalized ballot containing lists of candidates, initiatives, and referenda specific to their district. Using a mouse or other pointing device, voters make choices by clicking next to candidate names or next to *yes* or *no* for ballot measures. At the end of the process, choices are displayed for confirmation and the voter clicks on a "Cast Your Ballot" button.

At this time, the ballot is encrypted, digitally signed and sent to the VoteHere.net secure election center. When the center receives a ballot, it checks the digital signature for verification and then removes the voter's name from the list of eligible voters, thus preventing multiple ballot entries by the same registered voter — one person, one vote. The VoteHere Election System stores all the encrypted votes on indelible media. For each ballot issue or race, the ballot box contains the voter's name followed by the 1024-bit encrypted string of alphanumeric characters indicating their choice. This allows the election to be audited to verify *who* has voted without disclosing *how* they voted. Once the polls close, election authorities and designated observers use cryptographic keys to decrypt only the election tally; the individual ballots remain encrypted.

### **How much do I need to know about computers?**

Casting your vote over the Internet is simple. The system requires only that you be familiar with navigating the Internet using a web browser. Online ballots allow you to point-and-click with a mouse to select your choices and hit "enter" buttons.

### **When will I be able to cast my vote over the Internet?**

Just as with most new technology, the adoption of Internet voting for public sector elections will be a gradual one, starting at conventional poll-sites and evolving over time to voting from homes and offices. This gradual process was outlined in the California Internet Task Force's report and has also been embraced by VoteHere.net as a responsible approach to conducting online elections. As with all election systems, Internet election systems used in public sector elections must first pass stringent certification tests, administered by independent testing authorities, before their use is allowed for any public-sector election.

### **Who approves Internet voting?**

The use of new voting equipment at polling sites is generally *certified* by the Secretary of State's office. The approval of remote Internet voting will vary from state to state and may require statutory changes.

### **Why are some people and organizations opposed to Internet voting?**

Those who are opposed to Internet voting may be concerned about the security and access issues that accompany remote Internet voting with less secure protocols. (See the Security and Access area of this FAQ for more information on these issues.) They may also be concerned about the potential changes to the demographic makeup of voters.

### **How will voter demographics change as a result of the adoption of Internet voting?**

It is difficult to predict the ultimate change in voter demographics due to the adoption

of Internet voting. The hope is that this new technology will increase voter participation in all demographic areas because of increased convenience and increased accessibility to the ballot.

## **Will voter turnout increase as a result of the adoption of Internet voting?**

It is likely that voter turnout will increase by providing more convenient access to the ballot through the adoption of Internet voting. However, convenience is only one component of low voter turnout.

## **Security and Access**

### **How do you prevent someone from changing my vote?**

The VoteHere Election System prevents vote tampering and prevents voters from later denying that they cast a ballot by using digital signature technology. Your ballot is *signed* with your digital certificate before it is sent over the Internet to the election data center. At the election data center, this digital signature is checked to ensure that the ballot has not been *changed* in transit.

### **What are digital certificates and digital signatures?**

A digital signature is a cryptographic means through which one can verify the authenticity and integrity of a document. Digital certificates are used to generate digital signatures on documents. Digital certificates (also called digital identification or digital IDs) protect against forgery, false representation, or alteration.

### **How does the voter get a digital certificate?**

In the case of poll-site Internet voting, digital certificates are generated at the voting computer after the poll-site worker authenticates the voter. For remote Internet voting, the certificate is generated at the voter's computer during the Internet ballot declaration process, and authenticated by a live ink signature (that is, no faxes or copies) comparison against the signature on the voter's registration affidavit. This authentication procedure is similar to that used when obtaining a mail-in or absentee ballot in many states.

### **How do you know that each voter votes only once?**

Once a voter casts their ballot over the Internet, the system restricts anyone using the same identification and digital certificate from submitting another ballot.

### **Is my ballot private?**

The VoteHere Election System prevents anyone from discovering how a voter voted. Every voted ballot is encrypted using 1024-bit cryptography and individual ballots are stored in encrypted format at the Data Center. The VoteHere Election System's patent-pending technology protects ballot privacy by only decrypting and tabulating the election tally as a whole; individual ballots are never decrypted.

### **Aren't SSL (Secure Socket Layer) encryption and digital signatures enough to maintain my privacy and protect the election from fraud?**

SSL encryption and digital signatures are necessary but not enough to protect your privacy and the integrity of the election. Although SSL encryption is strong, it ensures only that (1) you are connected to the correct web site and (2) no one can see your voted ballot as it travels across the Internet. It doesn't protect your ballot

once it arrives at the Data Center. In a simple system, once the ballot arrives at the data center, it is automatically decrypted, and can then easily be read by election administrators. This violates the sanctity of the secret ballot and can open the election to compromise.

Digital signatures allow you to (1) sign on-line documents (like ballots) and (2) receive (but not send) encrypted messages (like login passwords). Digital signatures ensure that your ballot is never modified. However, digital signatures do nothing to protect the secrecy of your ballot. They also do not ensure that your ballot is properly counted in the final election results, even though it has not been altered.

It is extremely difficult to simultaneously protect the secrecy of the ballot and the integrity of the election. VoteHere.net has patents pending on its technology, which does meet the critical requirements for protecting the secrecy of the ballot and maintaining election integrity.

### **What prevents an *insider* from changing the results of an election?**

The greatest threat to an election is compromise by an insider who has been *bought*. Election compromise must be protected in two areas. First, individual ballots must be protected from tampering; ballots cannot be added, deleted, or changed. Second, the system must be based on *distributed trust*, where even the vendor cannot act as a trusted authority. The VoteHere Election System utilizes a *multi-authority* tabulation system which supports distributed trust. This is analogous to how elections are protected today by election officials, party observers, and poll watchers. No individual can access the election results, including VoteHere.net personnel.

### **Where can I learn more about the underlying cryptography used by the VoteHere Election System?**

For an in-depth discussion of cryptography, see VoteHere.net's technical brief, *Crypto 101*, on our website at [www.votehere.net](http://www.votehere.net) or for an independent third-party expert, see RSA Security's *CryptoFAQ* at <http://www.rsasecurity.com/rsalabs/faq/>.

### **Doesn't Internet voting further emphasize the digital divide — the disparity between the "haves" and the "have-nots"?**

Poll-site Internet voting is not impacted by the digital divide. It simply provides an alternative method for casting a ballot at the traditional poll-site. In fact, poll-site Internet voting creates *more* opportunities to vote. For example, assume your county has 100 poll-sites. Currently you can vote at only one of these 100 sites. With poll-site Internet voting, you can vote at *any* of the 100 poll-sites. Poll-site Internet voting provides greater access to the ballot for all. The adoption of remote Internet voting is dependent on the rate of Internet adoption. While it is true that access to personal computers and the Internet is not as prevalent as perhaps a television set, it will not be long until Internet access is readily available. It took telephones 30 years to reach 50 million users and television 13 years to reach the same number - amazingly, it has only taken four years for the Internet to reach the same number. If this rate continues, by the time states are ready to implement Internet election systems, the digital divide will be virtually gone. It is also important to remember that Internet voting is not a replacement for traditional poll-site voting. It is another option, like mail-in ballots, to help make voting more convenient, accessible and encourage voter participation.

### **What about voters who don't want to, or can't use the Internet?**

Voters who are unable or unwilling to use the Internet to cast their vote still have the option of voting using traditional equipment at a conventional poll-site. Internet <http://votehere.net/VH-Content-v2.0/wholefaq.html>

## **Administration**

### **How does it work behind the scenes for the election administrators?**

**Election and Ballot Configuration** — the VoteHere Election System provides a web-based election management system that allows the election administrator to easily create the necessary ballots for their election, as well as define the election parameters - dates and times the polls are open.

**Registration** — a database interface allows the importation of voter registration lists and any associated information used to authenticate voters identities.

**Authentication** — For poll-site Internet voting, poll workers are provided with an online voter list. The poll worker authenticates the voter in the conventional manner for that county or state. For remote Internet voting, voters are authenticated by matching their signature with the signature on the affidavit filed when they registered to vote.

**Multi-authority Tabulation** — To tabulate the election results, a group of election officials and observers simultaneously insert their decryption keys. Once all keys are inserted, the election results are decrypted and the vote tally is returned.

### **Can additional voter information be made available to voters while using the Internet ballot?**

The VoteHere Election System is capable of supporting links to on-line voter pamphlets.

### **How long does it take to get results?**

As soon as the tabulation keys are inserted by each of the designated election authorities and observers, the results are reported within minutes.

### **Can you do elections that have multiple ballot types, where a voter gets a certain ballot depending on his membership in a certain sub-group?**

Yes. Precinct information in the registered voter database determines which ballot is presented to the voter.

### **Can the order of the names and positions to which they are associated be randomized?**

Yes. It can be randomized or set to a predetermined order.

### **How do you handle recounts?**

Recounts are handled by clearing the results and re-tabulating; the new tally is available within minutes.

### **What about spoiled ballots?**

In a traditional polling place using paper ballots, a voter may be required a new ballot because they have mis-entered a vote which cannot be reversed. These mis-voted paper ballots are referred to as spoiled ballots. With the VoteHere Election

System, there is no such thing as a spoiled ballot. After the voter makes a decision on each race or issue, the system displays the entire ballot and their choices for review. At this point, the voter can make any changes necessary. A "button" is presented which says "Cast Ballot" which indicates that the voter is satisfied with all their selections. Hitting the "Cast Ballot" button is equivalent to putting a paper ballot into a ballot box.

### **Has your secure voting service been approved by the government for elections?**

VoteHere.net is actively pursuing certification in several states and expects approval of the system this year. VoteHere.net is closely involved with state government efforts in Washington, California, and Florida to define certification requirements for Internet voting. In fact, VoteHere.net was the only Internet voting company to participate on the California Internet Voting Task Force.

### **About VoteHere.net**

VoteHere.net is the leading worldwide supplier of secure Internet voting solutions. Founded in 1996, VoteHere.net, has developed proprietary patent-pending technology to provide secure, certifiable Internet voting systems for both public and private elections, market research, polling, and surveys. For more information, visit their web site at <http://www.votehere.net>, or by phone at 1.888.457.6863/425.827.5156 or email to [info@votehere.net](mailto:info@votehere.net). Correspondence may also be sent to VoteHere.net, 3101 Northup Way, Suite 250, Bellevue, WA 98004-1449.



## NewsBytes

### **VoteHere.net files series of patent applications for secure online voting**

In May, VoteHere.net, the leading worldwide supplier of secure online voting solutions, filed a series of patent applications addressing public online elections. This technology allows online Internet voting to meet or exceed the high standards of current public elections for voter privacy, security and universal verifiability. Current competitive online voting solutions, based upon an e-commerce model, do not incorporate the proprietary technologies covered by VoteHere.net's Intellectual Property (IP).

### **VoteHere.net wins Emerging Technology award for Internet voting system**

VoteHere.net took home top honors at the 11<sup>th</sup> Annual Emerging Business Awards luncheon, hosted by the Bellevue Chamber of Commerce. The company was honored with the **Emerging Technology Award**, highlighting businesses that have shown "innovation and entrepreneurial spirit" while demonstrating leadership in highly competitive markets.

### **CEO is keynote speaker at eGovernment Conference in Brussels**

Jim Adler, President and CEO of VoteHere.net, was the keynote speaker at the eGovernment 2000 Conference in Brussels in June, hosted by Cisco Systems, Inc. The conference, whose theme, Connected Government in the New Economy, focused on the Internet economy and how it is changing the way government works. Mr. Adler discussed the issue of **eVoting: Reshaping Democracy with Internet Voting**.

### **Online voting technology plays key role in SPEEA/Boeing contract resolution**

VoteHere.net and the Society of Professional Engineering Employees in Aerospace (SPEEA) made history by using Internet voting technology to bring about a rapid resolution to contract negotiations between the union and Boeing management. More than 70% of SPEEA engineers and technical workers voted on March 19 to accept the contract offer. VoteHere.net provided its secure Internet voting system for out-of-state members to vote on the contract offer. More than one hundred SPEEA members are located in states outside of Boeing's Seattle headquarters.

**For more information on VoteHere.net, visit our website at [www.votehere.net](http://www.votehere.net)**



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**For more information on VoteHere.net, visit our website at [www.votehere.net](http://www.votehere.net)**



***“The Internet represents the evolution of voting. It is convenient not only for the voter, but the poll worker as well. I truly believe this system will bring more people out to vote...”***

Grace Brown, Member  
League of Women Voters

*My day starts at 6 a.m. and doesn't end until 6:30 p.m. This makes it challenging for me to get to my poll-site and vote. The convenience and flexibility of Internet voting is better suited to my schedule and increases the likelihood that I'll be able to vote.”*

Carol Bemich  
Government and Economics Teacher

## Here's what people are saying about Internet voting and

 **VoteHere.net™**

*“Internet voting is great new technology. It was quick and easy...and we reversed the tide of diminishing turnout over the past six years. It saved us a lot of man power; we ran the election with half the staff and got done over two hours earlier on election night.”*

Travis Morgan, Elections Chair, Kansas State University

*“Using online balloting for this election was a first in Sarasota County. Thank you to VoteHere.net for assisting with this pilot project. I believe we demonstrated that Internet voting can be a positive experience. The enthusiasm and interest with which everyone approached this program was largely responsible for making it a success.”*

Marilyn Gerkin, Supervisor of Elections  
Sarasota County, Florida

***“The level of enthusiasm and interest of our voters indicates that there definitely is public support for Internet voting.”***

Sam Reed  
Thurston County Auditor  
Olympia, Washington

# Company Overview



## About VoteHere.net

Located in Bellevue, Washington, VoteHere.net is the leading worldwide provider of secure Internet voting. Founded in 1996 to supply cryptography products for the Internet, our expertise in data security led to the development and introduction of the VoteHere Election System in November 1998. Through innovative, patent-pending technology, VoteHere.net has developed secure, certifiable Internet voting systems for both public and private elections, which meet the three essential criteria for election integrity: privacy, security, and verifiability.

3101 Northup Way  
Suite 250  
Bellevue, WA 98004

Phone: 425-827-5156  
Fax: 425-739-6788

## Online Voting Industry

The Federal Election Commission reports that in 1998, there were over 140 million registered voters in the United States, yet voter turnout was a dismal 36.4%. According to a study conducted by the U.S. Census Bureau, the single biggest reason Americans give for not voting is time constraints.

Concurrently, the number of people gaining access to the Internet has been increasing at a phenomenal rate. According to a study by the California Voter Foundation, there were 100 million people using the Internet in 1998 with a projected increase to one billion by the year 2005. Internationally, there are over 50 countries that have adopted democratic election processes and voter participation levels outside the United States are much higher. The online voting market overseas is more than twice that of the United States.

The technology used for online voting has many applications. In addition to public sector elections, online voting can be used for private company and organization elections such as unions and universities, proxy voting, surveys, polls, and market research.

## Products and Services

VoteHere.net provides clients with the ability to conduct secure, universally verifiable, Internet elections by offering two versions of its online voting system:

**VoteHere Platinum:** This system is designed to meet the stringent standards for public-sector elections. VoteHere Platinum, which is targeted for certification as an election system in the United States and internationally, provides the highest levels of security and privacy. The system can be configured in two ways: a) as an alternative to conventional poll-site equipment; or b) as a system to enable remote voting from the home, office, or anywhere one can access the Internet.

**VoteHere Gold:** This system is targeted for use in private sector elections, surveys, polls, and market research. VoteHere Gold is designed for companies and organizations where security and privacy are a high priority for their online elections and the system provides greater security than typical Internet financial and e-commerce transactions. Clients include corporations, associations, unions, universities, and market research firms.

Security standards for public elections are much higher than for private sector, proxy, union, or association elections. VoteHere.net's patent-pending technology ensures that public elections conducted online meet stringent standards for ballot privacy, tabulation accuracy, election/vote verifiability and post-election audits. This is achieved through a complex system that combines high-level encryption for vote transmission, a "distributed trust" multi-authority method of tabulation, and the preservation of ballot confidentiality while allowing for a publishable audit trail.

## Executive Management Team



### **Jim Adler – President and CEO**

Jim Adler is VoteHere.net's founder, President and CEO. Mr. Adler brings a strong technical background as well as previous business experience to VoteHere.net. Mr. Adler is active in the national discourse on Internet voting.

3101 Northup Way  
Suite 250  
Bellevue, WA 98004

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He serves on California's Internet Voting Task Force, has testified before the Washington state legislature, and is active in defining certification procedures for Internet voting. Beyond Internet voting, Mr. Adler has a rich technical background in cryptography and signal processing. In 1993, Mr. Adler co-founded Tritera (formerly Tangent Systems), a systems design and engineering consulting company. Under a Tritera contract to Scientific-Atlanta, Mr. Adler invented pioneering digital signature techniques that allow documents to be safely sent through the Internet (US Patent #5,606,609). Previously, Mr. Adler worked for General Dynamics Space Systems Division (acquired by Lockheed Martin) where he led the development of mission critical avionics systems for Titan/Centaur rockets and advanced launch systems. Mr. Adler received his BS in Electrical Engineering with High Honors from the University of Florida and his MS in Electrical Engineering from the University of California, San Diego.

### **C. Andrew Neff, Ph.D. – Chief Scientist**

Dr. Neff was a Research Staff Member at the IBM T.J. Watson Research Center. While there, he developed and published several new ideas in the areas of algebraic and geometric computation and Design of Experiments. In 1990 and 1996 he solved a fundamental problem determining the optimal complexity of solving non-linear univariate equations, which had been an open problem, important to several fields of computer science, since the mid 1970s. He left IBM to work for Stratasys, a company developing a "3D printing" machine for direct forming of solid parts from electronic data. There he improved on state-of-the-art software for geometric manipulations, as well as dynamic control. In 1998, he joined the technical team at Ioptics where he developed algorithms for advanced signal processing. Dr. Neff received his BS and MS from the University of Chicago, and his Ph.D. in theoretical mathematics from Princeton University.

### **Scott Axworthy – Vice President of Information Technology and Operations**

Scott Axworthy brings over 15 years of experience in information technology, information systems, software development, project management, and operations. Before joining VoteHere.net, Mr. Axworthy held the position of Manager, IS Infrastructure, with Duet Technologies/Cascade Design Automation in Bellevue, WA, where he was responsible for the IT and IS needs of this international, high-tech software/services company. Prior to this, from 1983 to 1986, he was a software engineer for Boeing Aerospace developing and supporting electronic CAD software. Mr. Axworthy holds a Bachelor of Science degree in General Physical Science from Washington State University.

### **Deborah Brunton – Vice President of Government Affairs**

Deborah Brunton comes to VoteHere.net from the Microsoft Corporation, where she held the position of Director of State Government Affairs in the Law and Corporate Affairs department. In this role, she was responsible for a program focused on issue advocacy, policy development, relationship building and industry affairs management. From 1989 to 1993, she also served as Press Secretary for United States Senator Slade Gorton. Her professional associations include membership in the United States Internet Council Advisory Board and the State Government Affairs Initiative of the Information Technology Association of America. Ms. Brunton received her Bachelor of Arts in History from Whitman College.

# The Evolution of Internet Voting



Just as with most new technology, the adoption of Internet voting for public sector elections will be a gradual one, starting at conventional poll-sites and evolving over time to voting from homes and offices. This gradual process was outlined in the California Internet Task Force's report and has also been embraced by VoteHere.net as a responsible approach to conducting online elections. As with all election systems, Internet election systems used in public sector elections must first pass stringent certification tests, administered by independent testing authorities, before their use is allowed for any public-sector election. This paper outlines VoteHere.net's approach to this evolutionary adoption process for online voting.

3101 Northrup Way  
Suite 250  
Bellevue, WA 98004

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Fax: 425-739-6788

## **Poll-site Internet voting**

Poll-site Internet voting simply describes the use of Internet-connected computers and appliances at conventional poll-sites. In this case, the PCs either replace or reside alongside conventional dedicated poll-site equipment. Poll-site Internet voting eliminates the questions raised over accessibility of the Internet. In addition, the security required to ensure that the voter is who they say they are remains as it is today – through authentication by a poll worker prior to accessing a polling station.

### **Phase 1: Traditional poll-site Internet voting**

The advantage to Internet voting at poll-sites is that voters can visit *any* polling place to cast their ballot. Poll-site Internet voting increases access by providing all voters more opportunities to vote. Currently, a registered voter can only vote at one poll-site. This can present a challenge for people who can't get to that one site in time to vote for a variety of reasons: transportation, time constraints, health, etc. With Internet voting, the voter can vote at *any* poll-site. This means the voter could choose from hundreds of polling places, including ones that may be closer to home, work, or school.

### **Phase 2: Select Location Internet voting**

The next logical step for Internet voting is to expand online voting options by allowing election officials to take advantage of computers, Internet connections and appliances at public places such as community centers, libraries, and business/computer centers. This is a good use of existing resources as well as another way to further increase access and improve voter turnout. At the same time, election officials would be present to ensure that voter authentication, privacy and security measures are in place.

## **Remote Internet voting**

Remote Internet voting allows voters to cast their ballots from any PC connected to the Internet from anywhere in the world. Remote Internet voting is simply an alternative to mail-in voting, which is already in use in many states today. Just as poll-site Internet voting systems must be state-certified, so too must remote Internet voting systems. In addition, many states must pass legislation to allow its use.

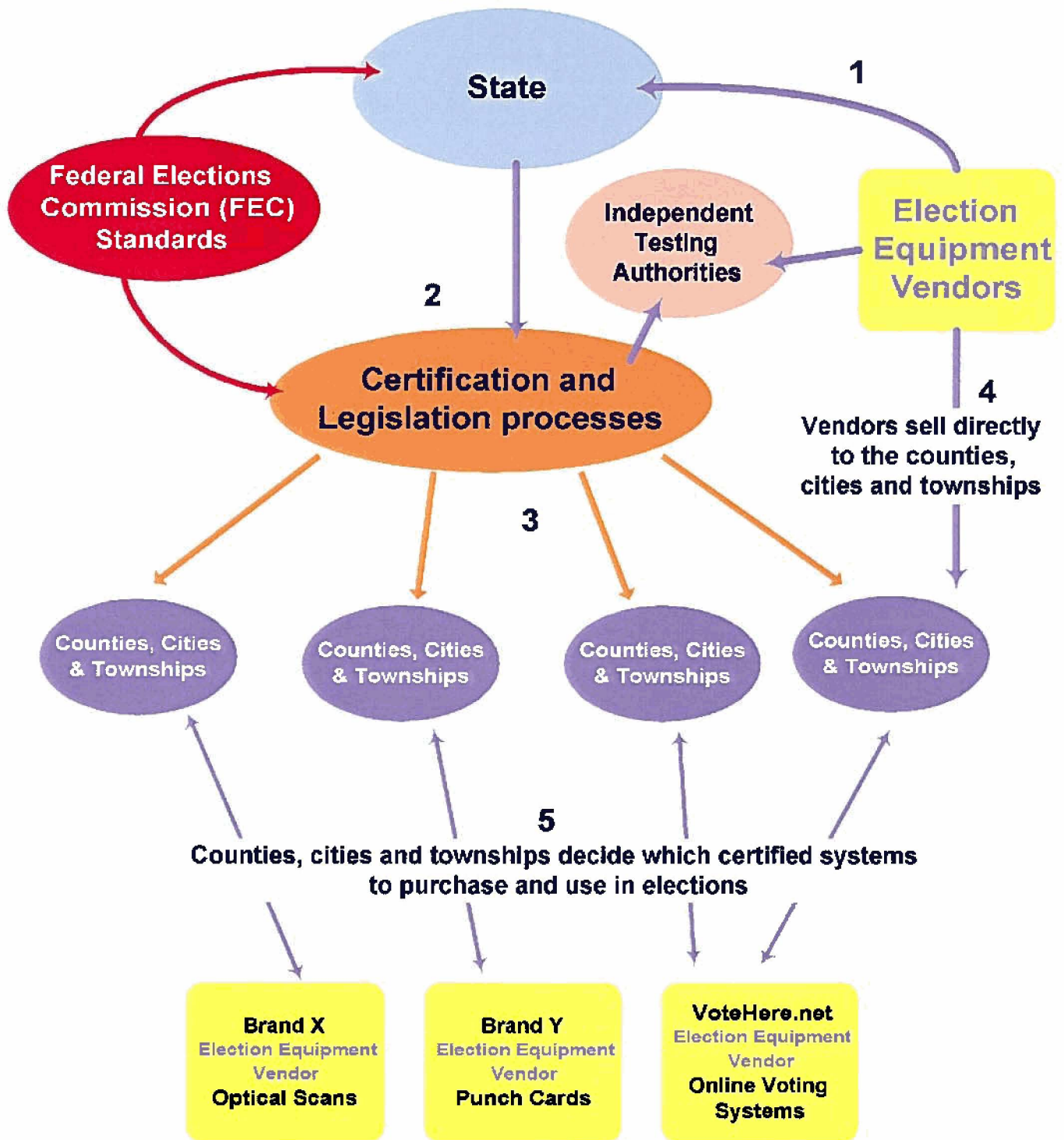
### **Phase 3: Remote Internet voting for select groups**

One of the key advantages to Internet voting is that it is not constrained by geography. Voting is not limited to the area in which the election takes place. This means that voters who traditionally may not have been able to participate in elections would now be able to do so. This includes military personnel, residents in retirement homes, disabled persons and satellite office employees whose homes and businesses are in another city, state, or country. In this phase, voters who know they will be out of town or unable to visit an election site on the day of the election, can make arrangements to use an Internet voting system to cast their ballots.

### **Phase 4: Remote Internet voting**

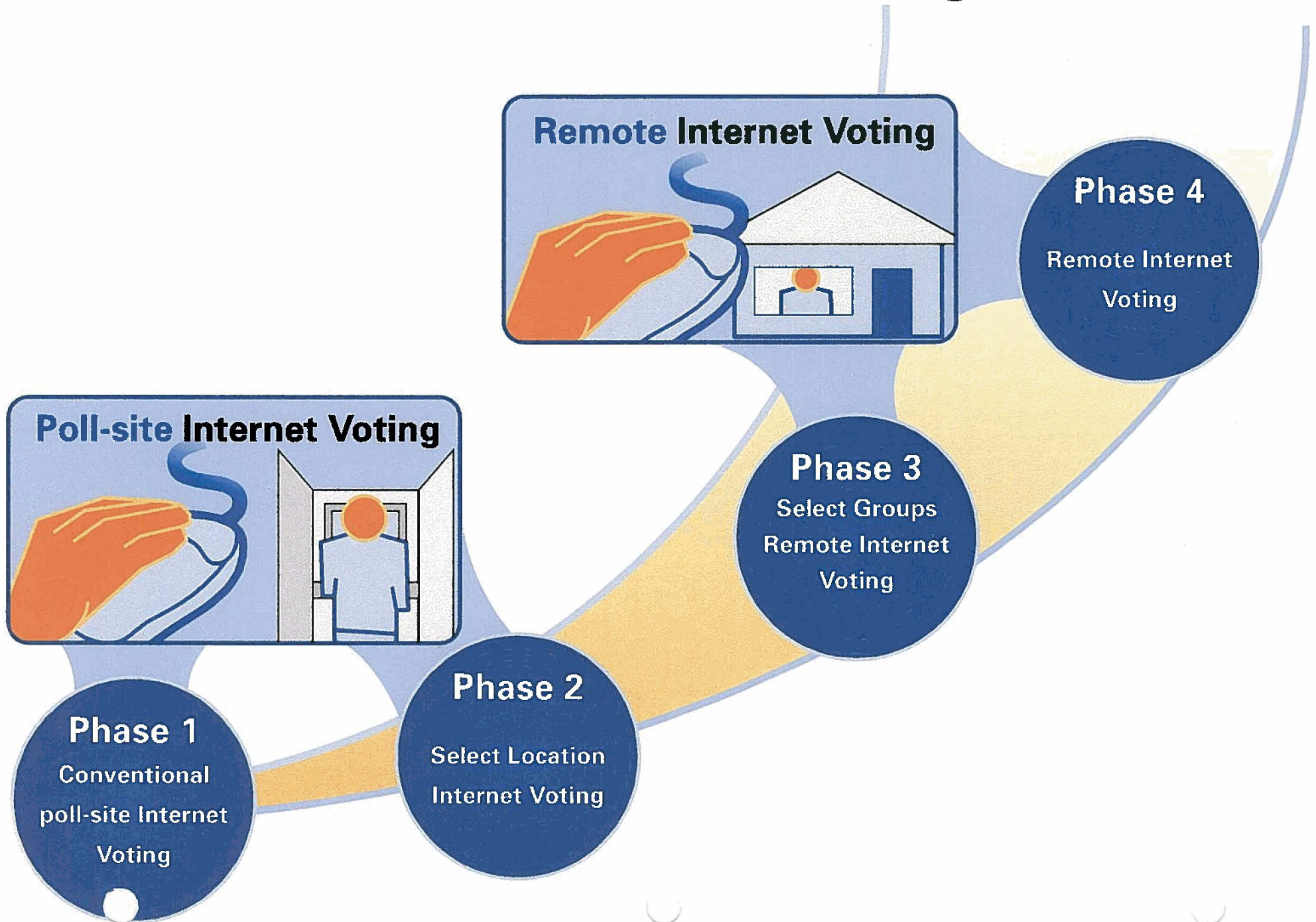
Voters would be able to cast their ballots online from anywhere there is an Internet connection, including their homes or workplaces. Voters are authenticated with a password and digital signature provided by their county election official. Voters would use a secure online election system, certified and authorized for use by the state, to cast their ballots via the Internet.

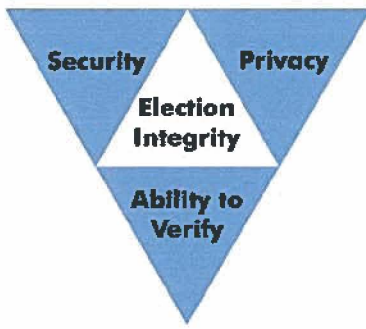
# Process for Certifying and Purchasing Election Equipment in the U.S.



1. Election equipment vendors submit systems to the state for certification.
2. The certification process varies by state. It generally includes a combination of legislation, FEC standards, and testing by independent authorities.
3. Certification determines which systems counties, cities and townships can use in their elections.
4. Once their system meets certification requirements, election equipment vendors can sell their systems directly to the counties, cities and townships.
5. Counties, cities and townships decide which certification system to purchase and use in elections to best meet the needs of their voters.

# The Evolution of Internet Voting





## Key Principles of Election Integrity



3101 Northup Way  
Suite 250  
Bellevue, WA 98004  
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Fax: 425-739-6788

### **VoteHere.net has solved the difficult problem of the conflicting requirements for election integrity: privacy, security and verifiability.**

Although there had been research as far back as 20 years ago on Internet voting, technologies did not exist that could support all of these requirements. VoteHere.net's technical staff of mathematical and cryptographic experts spent years solving the problem, resulting in the introduction of the VoteHere.net Election System in November 1998, the release of its 2.1 product (VoteHere Gold) for private sector elections and the pending release of Version 3.0 (VoteHere Platinum) for state-level certification in 2000.

### **There are key differences between e-commerce transactions, polls or surveys and online elections – privacy and security.**

Typical Internet polling or survey software has been around for years, primarily because the technical requirements for these systems are fairly trivial. These systems were not designed for the stringent security, privacy, and "distributed trust" tabulation requirements that are needed for online voting, especially with respect to public sector elections. VoteHere.net's election systems provide the highest level of security throughout the entire voting process, from 1024-bit encryption for ballot transmission to a sophisticated, secure data center for storing the ballots to its patent-pending technology for maintaining voter privacy during tabulation and auditing.

### **An Internet voting system must be impervious to both outside and inside attack.**

While much emphasis has been placed on hackers and "cyber terrorism" (outside attacks), an equal threat to Internet voting is that an insider who has been "bought" could compromise the election. An Internet voting system must protect against both types of attack. First, by ensuring that individual ballots cannot be tampered with – that ballots cannot be added, deleted, or changed. Secondly, the system must be based on a multi-authority or "distributed trust" model for tabulation, similar to the process used in conventional elections, to ensure accurate tallies and protect against election fraud. The VoteHere election system provides both.

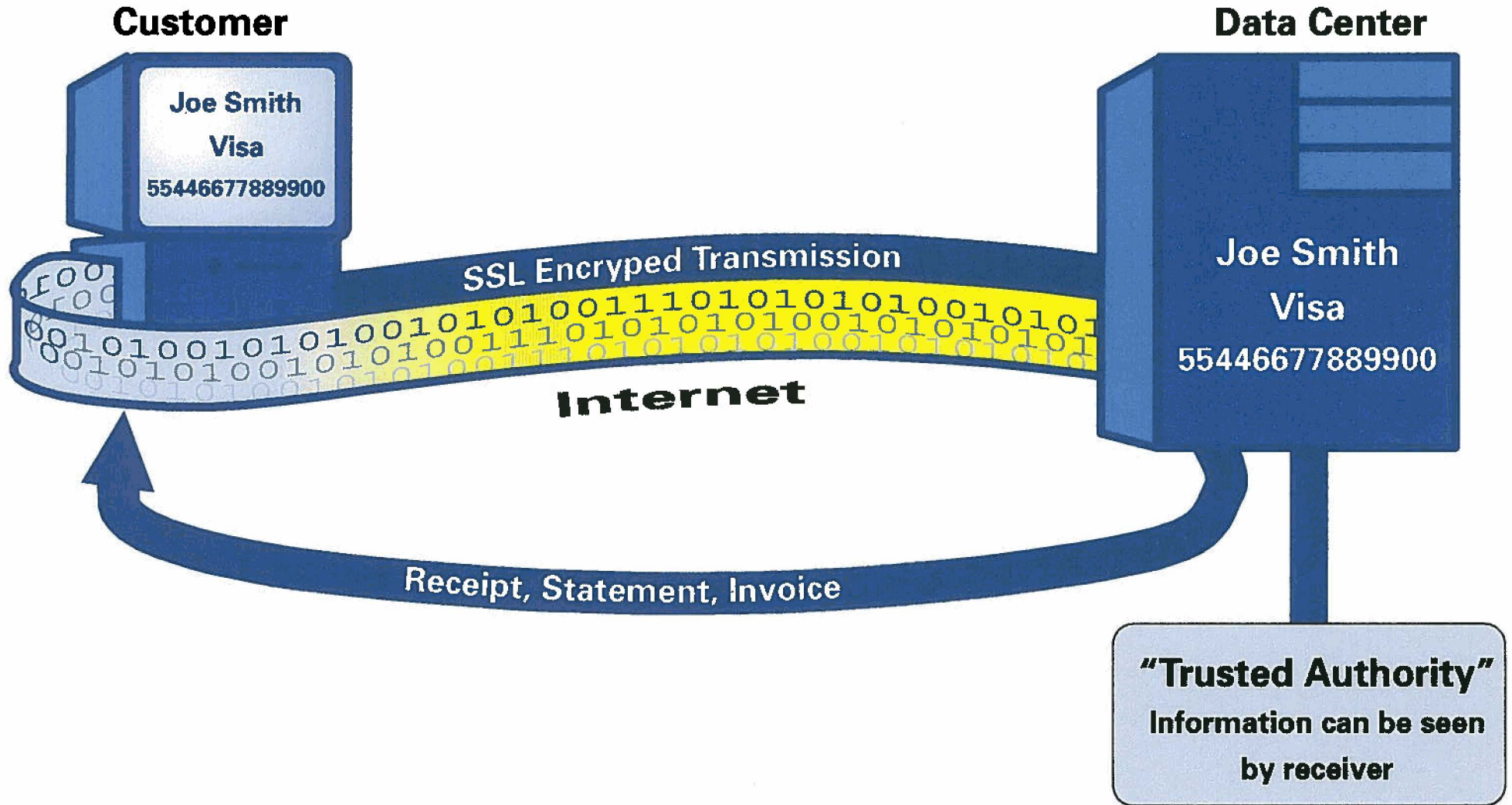
### **The critical element of 'distributed trust.'**

It is generally satisfactory for a poll or survey to be conducted by a "trusted authority" (a single entity who is entrusted with the task of ensuring the integrity of an election) as there is little to no incentive for that authority to change the outcome and little incentive for outsiders to pay off someone to change the outcome. Conversely, in a public sector government election, the outcome is of much greater importance and – although illegal – there are powerful people and organizations that may have the resources to "fix" an election outcome by influencing someone on the "inside." Therefore, whether using the Internet or conventional procedures, a public sector election must be overseen through a "distributed trust" or multi-authority process where a number of designated persons must be present to activate the "key" to tabulate the results of the election.

### **Universal verification.**

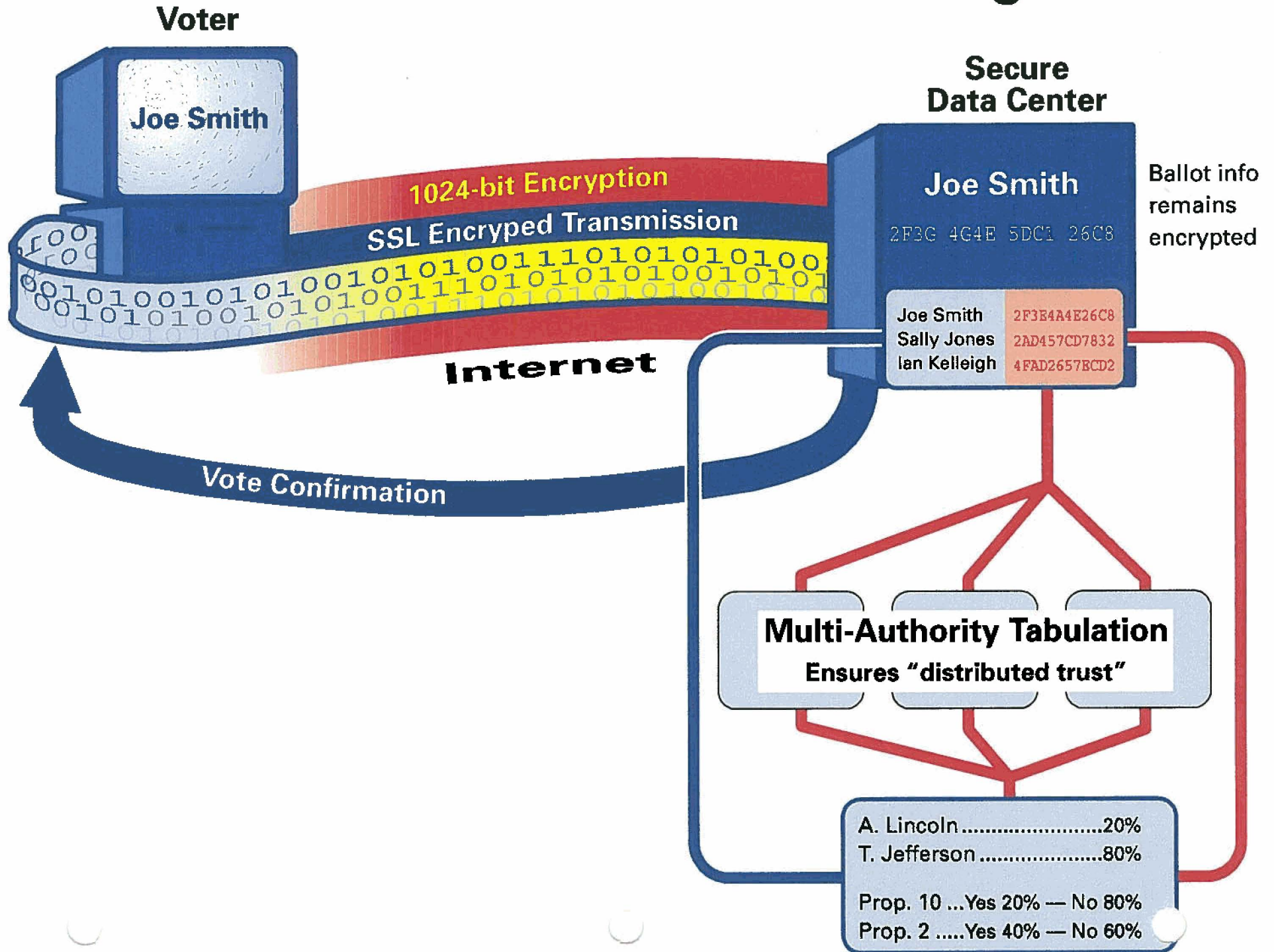
VoteHere.net election systems store all the encrypted ballots, which contain the voter's name followed by an encrypted string of alphanumeric characters indicating their choice. This allows the election to be audited to verify *who* has voted without disclosing *how* they voted. Once the polls close, election authorities and designated observers use tabulation keys to decrypt *only* the election tally. Individual ballots remain encrypted, ensuring that all voters' choices remain private. As each online vote is received at the "ballot box" (Data Center), a confirmation is sent to the voter informing them that their ballot has been cast successfully. The individual ballots, which remain encrypted, are permanently recorded on indelible media to allow for a recount should it be necessary.

# E-Commerce Simple Solution





# VoteHere Process for Internet Voting



# Benefits of Internet Voting



*VoteHere.net's election systems stand to change the way people think about elections today by providing greater access, faster results, and lower costs without sacrificing privacy or security.*

3101 Northrup Way  
Suite 250  
Bellevue, WA 98004

Phone: 425-827-5156  
Fax: 425-739-6788

## **Increased access and convenience**

**Poll-site:** Voters can vote from any poll-site within their county. Registered voter rolls are available online for authentication by poll workers and ballots are presented on the poll-site PCs based on the voter identification. Voters are not limited to one designated poll-site for voting and will not have to travel back to their designated poll-site to cast their vote if they are somewhere else in the county during the election.

**Remote:** Once adopted, voters would be able to vote from anywhere that an Internet connection is available. Nursing home residents, the handicapped, military personnel, vacationers, and many other currently disenfranchised groups will be able to vote where they want and when they want. Elections could be held over extended periods of time (24-hours) and very few additional "poll" workers would be needed to increase capacity.

## **Tabulation time and accuracy**

Because tabulation is done electronically, not manually, it is significantly faster than hand-counting or machine-counting paper ballots. In addition, it is not subject to human error, whether that occurs by miscounting or by mishandling of paper ballots.

## **Cost-effective equipment**

**Poll-site:** The cost of purchasing, maintaining, and storing conventional poll-site equipment is expensive. With Internet voting, counties can use computer equipment that already exists today in many schools and libraries or new affordable Internet appliances. As a result, if the county is already in the purchasing cycle for new election equipment, they can purchase many more systems and provide these to local schools, libraries and community centers creating additional polling places where the equipment can be utilized year-round.

**Remote:** There is no additional capital equipment cost to counties and subsequently, taxpayers.

## **Reduced cost of elections**

The costs of conducting and participating in elections will decrease. Savings can be found everywhere from the cost of creating, printing, and distributing paper ballots to the stamps for mail-in absentee ballots, and even the cost of gas for getting to your designated poll-site.

## **Increased voter turnout**

Currently, voter turnout in the U.S. is low. Although not the only step necessary to increase voter turnout, Internet voting does provide opportunities to increase voter participation, especially in primary and special elections, by eliminating barriers of time constraints, travel restrictions, and access to designated poll-sites.

# Internet Voting Definition of Terms



*Internet voting comes with its own unique set of terms to define its operation and implementation. This paper is meant to define terms often used in discussing Internet voting, which may not be familiar to all who are interested in the subject.*

3101 Northup Way  
Suite 250  
Bellevue, WA 98004

Phone: 425-827-5156  
Fax: 425-739-6788

**Poll-site Internet voting** – An election in which Internet voting stations are made available at conventional poll-sites where access and security are controlled as they are today. These could also include schools and libraries where Internet access is already available.

**Remote Internet voting** – The ability to vote from anywhere an Internet connection is available, such as home or office.

**Trusted authority** – A voting system in which a person or entity is entrusted with the tabulation of ballots and the integrity of the election.

**Multi-authority or Distributed trust** – A voting system in which the trust is distributed among various entities such that no single person or entity is responsible for the tabulation and reporting of an election.

**Encryption** – Encryption is the transformation of data into a form that is difficult, if not impossible, to read without the appropriate “key”; it ensures privacy by keeping information hidden from anyone for whom it is not intended, even those who have access to the encrypted data. 512-bit encryption is the standard used by most E-commerce transactions today. 1024-bit encryption, utilized by Votehere.net, is *trillions* of times stronger.

**Secure Socket Layer (SSL)** – An encryption protocol used for ensuring the privacy and integrity of a transaction over the Internet.

**Public-sector elections** – Elections that are held with the use of government and/or taxpayer money and regulated by government.

**Private-sector elections** – Elections that are conducted and funded by private organizations (corporations, unions, political parties, etc.). These elections are only subject to regulations, if any, which are defined by the sponsoring organization.

**Election integrity** – Public-sector elections require the privacy of a voted ballot, the ability for anyone to audit the election for verifiability, and the security of the entire system.

**Authentication** – A process through which one proves and verifies certain information. In elections, it is the process by which a voter’s eligibility to vote is verified.

**Digital certificate** – An electronic credential issued by a trusted third party. The most common use of a digital certificate is to verify that a user sending a message is who he or she claims to be, and to provide the receiver with the means to encode a reply.

**Digital signature** – A digital code that can be attached to an electronically transmitted message that uniquely identifies the sender and integrity of the message. Like a written signature, the purpose of a digital signature is to guarantee that the individual sending the message really is who he or she claims to be. Digital signatures are a key component of authentication and use encryption to guarantee security.

# Frequently Asked Questions



*This list of frequently asked questions has been divided into three sections: General questions on Internet voting, questions regarding security and access and questions that administrators may have about how the VoteHere Election System will work in their environment.*

3101 Northrup Way  
Suite 250  
Bellevue, WA 98004

Phone: 425-827-5156  
Fax: 425-739-6788

## General

### What is Internet voting?

Internet voting is simply another way to cast a vote. Just as anyone can vote at a poll-site using a punch-card system or direct recording device or use the U.S. Postal Service to send an absentee ballot, Internet voting is another option available to registered voters.

There are two types of Internet voting systems: **Poll-site Internet voting** and **Remote Internet voting**. Poll-site Internet voting is characterized by the use of Internet-connected personal computers located at traditional polling locations, schools, and libraries. In this case, Internet voting is simply an alternative system to existing poll-site equipment. Remote Internet voting, on the other hand, is where you vote from anywhere an Internet connection can be established – home, work, retirement center, library, etc. As with all election equipment, Internet voting systems must be certified by state officials to ensure that stringent security requirements are met that protect the secrecy of your vote and the integrity of the election.

### What are the benefits to Poll-site Internet Voting?

Poll-site Internet voting provides greater access than current voting options. Today, a voter is assigned to a particular poll-site near their home. This is primarily done because it is cost prohibitive to provide all possible ballots at all poll-sites. With poll-site Internet voting, a voter can go to the poll-site in the county that is most convenient to them – whether it be near their home, workplace, or elsewhere in their area.

Because counties can use existing equipment (personal computers) located in public schools and libraries, there is a fairly low-cost path to opening new poll-sites. In addition, if the county is in the purchasing cycle for new poll-site equipment, they now have the option of purchasing low-cost personal computers rather than expensive, specialized election equipment. These new computers could be placed in libraries, schools, retirement centers, and social service agencies with the stipulation that they be available to all registered voters on election days. This not only provides a valuable service to the community, it also reduces storage costs, and creates more poll-sites in locations convenient to all.

### How does the VoteHere Election System work?

Voters are authenticated either by poll workers at a poll-site or in the same manner that mail-in or absentee voting is done today – through a voter declaration form submitted to the county prior to the election. Once authenticated, the registered voter is provided with a digital certificate, typically stored on a floppy disk, to be used when they cast their ballot.

When the voter is ready to cast their ballot, they access an Internet-connected computer (either at the poll-site or remotely) and enter the VoteHere.net election website. The voter will be prompted for personal identification as well as their digital certificate. Once the system acknowledges that the voter is eligible to vote, the voter is presented with a personalized ballot containing lists of candidates, initiatives, and referenda specific to their district. Using a mouse or other pointing device, voters make choices by clicking next to candidate names or next to *yes* or *no* for ballot measures. At the end of the process, choices are displayed for confirmation and the voter clicks on a “Cast Your Ballot” button.

At this time, the ballot is encrypted, digitally signed and sent to the VoteHere.net secure election center. When the center receives a ballot, it checks the digital signature for verification and then removes the voter's name from the list of eligible voters, thus preventing multiple ballot entries by the same registered voter – one person, one vote. The VoteHere Election System stores all the encrypted votes on indelible media. For each ballot issue or race, the ballot box contains the voter's name followed by the 1024-bit encrypted string of alphanumeric characters indicating their choice. This allows the election to be audited to verify *who* has voted without disclosing *how* they voted. Once the polls close, election authorities and designated observers use cryptographic keys to decrypt only the election tally; the individual ballots remain encrypted.

### **How much do I need to know about computers?**

Casting your vote over the Internet is simple. The system requires only that you be familiar with navigating the Internet using a web browser. Online ballots allow you to point-and-click with a mouse to select your choices and hit "enter" buttons.

### **When will I be able to cast my vote over the Internet?**

Just as with most new technology, the adoption of Internet voting for public sector elections will be a gradual one, starting at conventional poll-sites and evolving over time to voting from homes and offices. This gradual process was outlined in the California Internet Task Force's report and has also been embraced by VoteHere.net as a responsible approach to conducting online elections. As with all election systems, Internet election systems used in public sector elections must first pass stringent certification tests, administered by independent testing authorities, before their use is allowed for any public-sector election.

### **Who approves Internet voting?**

The use of new voting equipment at polling sites is generally *certified* by the Secretary of State's office. The approval of remote Internet voting will vary from state to state and may require statutory changes.

### **Why are some people and organizations opposed to Internet voting?**

Those who are opposed to Internet voting may be concerned about the security and access issues that accompany remote Internet voting with less secure protocols. (See the security and access areas of this FAQ for more information on these issues.) They may also be concerned about the potential changes to the demographic makeup of voters.

### **How will voter demographics change as a result of the adoption of Internet voting?**

It is difficult to predict the ultimate change in voter demographics due to the adoption of Internet voting. The hope is that this new technology will increase voter participation in all demographic areas because of increased convenience and increased accessibility to the ballot.

### **Will voter turnout increase as a result of the adoption of Internet voting?**

It is likely that voter turnout will increase by providing more convenient access to the ballot through the adoption of Internet voting. However, convenience is only one component of low voter turnout

## **Security and Access**

### **How do you prevent someone from changing my vote?**

The VoteHere Election System prevents vote tampering and prevents voters from later denying that they cast a ballot by using digital signature technology. Your ballot is *signed* with your digital certificate before it is sent over the Internet to the election data center. At the election data center, this digital signature is checked to ensure that the ballot has not been *changed* in transit.

### **What are digital certificates and digital signatures?**

A digital signature is a cryptographic means through which one can verify the authenticity and integrity of a document. Digital certificates are used to generate digital signatures on documents. Digital certificates (also called digital identification or digital IDs) protect against forgery, false representation, or alteration.

### **How does the voter get a digital certificate?**

In the case of poll-site Internet voting, digital certificates are generated at the voting computer after the poll-site worker authenticates the voter. For remote Internet voting, the certificate is generated at the voter's computer during the Internet ballot declaration process, and authenticated by a *live ink signature* (that is, no faxes or copies) comparison against the signature on the voter's registration affidavit. This authentication procedure is similar to that used when obtaining a mail-in or absentee ballot in many states.

### **How do you know that each voter votes only once?**

Once a voter casts their ballot over the Internet, the system restricts anyone using the same identification and digital certificate from submitting another ballot.

### **Is my ballot private?**

The VoteHere Election System prevents anyone from discovering how a voter voted. Every voted ballot is encrypted using 1024-bit cryptography and individual ballots are stored in encrypted format at the Data Center. The VoteHere Election System's patent-pending technology protects ballot privacy by only decrypting and tabulating the election tally as a whole; individual ballots are never decrypted.

### **Aren't SSL (Secure Socket Layer) encryption and digital signatures enough to maintain my privacy and protect the election from fraud?**

SSL encryption and digital signatures are necessary but not enough to protect your privacy and the integrity of the election. Although SSL encryption is strong, it ensures only that (1) you are connected to the correct web site and (2) no one can see your voted ballot as it travels across the Internet. It doesn't protect your ballot once it arrives at the Data Center. In a simple system, once the ballot arrives at the data center, it is automatically decrypted, and can then easily be read by election administrators. This violates the sanctity of the secret ballot and can open the election to compromise.

Digital signatures allow you to (1) sign on-line documents (like ballots) and (2) receive (but not send) encrypted messages (like login passwords). Digital signatures ensure that your ballot is never modified. However, digital signatures do nothing to protect the secrecy of your ballot. They also do not ensure that your ballot is properly counted in the final election results, even though it has not been altered.

It is extremely difficult to simultaneously protect the secrecy of the ballot and the integrity of the election. VoteHere.net has patents pending on its technology, which *does* meet the critical requirements for protecting the secrecy of the ballot and maintaining election integrity.

### **What prevents an *insider* from changing the results of an election?**

The greatest threat to an election is compromise by an insider who has been *bought*. Election compromise must be protected in two areas. First, individual ballots must be protected from tampering; ballots cannot be added, deleted, or changed. Secondly, the system must be based on *distributed trust*, where even the vendor cannot act as a trusted authority. The VoteHere Election System utilizes a *multi-authority* tabulation system which supports distributed trust. This is analogous to how elections are protected today by election officials, party observers, and poll watchers. No individual can access the election results, including VoteHere.net personnel.

### **Where can I learn more about the underlying cryptography used by the VoteHere Election System?**

For an in-depth discussion of cryptography, see VoteHere.net's technical brief, *Crypto 101*, on our website at [www.votehere.net](http://www.votehere.net) or for an independent third-party expert, see RSA Security's *CryptoFAQ* at <http://www.rsasecurity.com/rsalabs/faq/questions.html>.

### **Doesn't Internet voting further emphasize the 'digital divide' – the disparity between the 'haves' and the 'have-nots'?**

Poll-site Internet voting is not impacted by the digital divide. It simply provides an alternative method for casting a ballot at the traditional poll-site. In fact, poll-site Internet voting creates *more* opportunities to vote. For example, assume your county has one hundred poll-sites. Currently you can vote at only *one* of these one hundred sites. With poll-site Internet voting, you can vote at *any* of the one hundred poll-sites. Poll-site Internet voting provides greater access to the ballot for all. The adoption of remote Internet voting is dependent on the rate of Internet adoption. While it is true that access to personal computers and the Internet is not as prevalent as perhaps a television set, it will not be long until Internet access is readily available. It took telephones 30 years to reach 50 million users and television 13 years to reach the same number – amazingly, it has only taken four years for the Internet to reach the same number. If this rate continues, by the time states are ready to implement Internet election systems, the digital divide will be virtually gone. It is also important to remember that Internet voting is not a replacement for traditional poll-site voting. It is an option, like mail-in ballots, to help make voting more convenient, accessible and encourage voter participation.

### **What about voters who don't want to, or can't use the Internet?**

Voters who are unable or unwilling to use the Internet to cast their vote still have the option of voting using traditional equipment at a conventional poll-site. Internet voting is simply another way to cast a ballot.

## **Administration**

### **How does it work behind the scenes for the election administrators?**

Election and Ballot Configuration – The VoteHere.net Election System provides a web-based election management system that allows the election administrator to easily create the necessary ballots for their election, as well as define the election parameters; such as dates and times the polls are open.

Registration – A database interface allows the importation of voter registration lists and any associated information used to authenticate voters' identities.

Authentication – For poll-site Internet voting, poll workers are provided with an online voter list. The poll worker authenticates the voter in the conventional manner for that county or state. For remote Internet voting, voters are authenticated by matching their signature with the signature on the affidavit filed when they registered to vote.

Multi-Authority Tabulation – To tabulate the election results, a group of election officials and observers simultaneously insert their tabulation keys. Once all keys are inserted, the election results are decrypted and the vote tally is returned.

### **Can additional voter information be made available to voters while using the Internet ballot?**

The VoteHere Election System is capable of supporting links to on-line voter pamphlets.

### **How long does it take to get results?**

As soon as the tabulation keys are inserted by each of the designated election authorities and observers, the results are reported within minutes.

### **Can you do elections that have multiple ballot types, where a voter gets a certain ballot depending on his membership in a certain sub-group?**

Yes. Precinct information in the registered voter database determines which ballot is presented to the voter.

### **Can the order of the names and positions to which they are associated be randomized?**

Yes. It can be randomized or set to a predetermined order.

### **How do you handle recounts?**

Recounts are handled by clearing the results and re-tabulating; the new tally is available within minutes.

### **What about spoiled ballots?**

In a traditional polling place using paper ballots, a voter may require a new ballot because they have mis-entered a vote, which cannot be reversed. These mis-voted paper ballots are referred to as *spoiled ballots*. With the VoteHere Election System, there is no such thing as a spoiled ballot. After the voter makes a decision on each race or issue, the system displays the entire ballot and their choices for review. At this point, the voter can make any changes necessary. A "button" is presented which says "Cast Ballot" which indicates that the voter is satisfied with all their selections. Hitting the "Cast Ballot" button is equivalent to putting a paper ballot into a ballot box.

### **Has your secure voting service been approved by the government for elections?**

VoteHere.net is actively pursuing certification in several states and expects approval of the system this year.

VoteHere.net is closely involved with state government efforts in Washington, California, and Florida to define

certification requirements for Internet voting. In fact, VoteHere.net was the only Internet voting company to participate in California's Internet Voting Task Force.

BY STEPHEN H. WILDSTROM

## CLICK AND BE COUNTED

Online elections could work if security and equal access for all can be guaranteed

When engineers voted in March to end their strike against Boeing, the decision wasn't made at a raucous union meeting or in polling booths. Instead, members of the Society of Professional Engineering Employees in Aerospace cast secret ballots on their own computers. Such experiments, both public and private, are paving the way to online elections of all sorts.

The challenges to online voting are great enough that it won't be used in this year's elections, except for a few limited experiments. Some residents of Florida, South Carolina, Texas, and Utah stationed overseas in the military will vote online this autumn. The impediments to broader use fall into four areas, three concerning online security, the fourth equal access to the polls.

**CRYPTOGRAPHIC KEY.** The first problem is positive identification of online voters. When Arizona Democrats conducted an online Presidential preference poll in March, officials simply mailed each voter a personal identification code. Entering the number on a Web site allowed a vote to be cast. Most election security experts found this inadequate because the ID numbers could have been lost or stolen. "I'm very worried that some jurisdiction will have an online election that turns into a dis-

aster," says Clay Roberts, director of the Florida Elections Division. "That would set back a technology that could be a boon for everyone."

Jim Adler, CEO of Vote-Here.net, which ran the Boeing election, suggests a more complex but more secure sys-

tem, which is required to vote, is only activated after the affidavit is checked against a signature on file.

While precise identification is essential, so is keeping ballots private. One solution is the electronic equivalent of a system used for absentee ballots. An absentee voter puts the ballot into an unmarked envelope, which is placed inside another envelope that he or she signs and seals before mailing. At the election office, the outer envelope is discarded before the anonymous inner one is opened.

In the electronic version, computer software will en-

different authorities each have one part and must cooperate to count the votes.

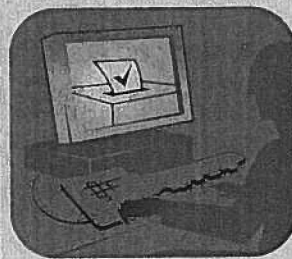
Finally, the system itself must be secure. That means votes are safe from tampering once cast and that the entire system is protected from the sort of attacks that have blocked service at popular Web sites. There's no magic solution to the problem. Encryption helps, but votes must also be moved quickly from the Web servers where they are collected to more secure computers. Preventing denial of service attacks is harder, especially since hackers know just when the electronic polls are open. The best answer is vigilance and the use of multiple redundant servers.

In some ways, the social problems of electronic voting may pose a bigger challenge than the technical ones. The well-off are far more likely to have home PCs than the poor. "If you have a system that makes it easier for the middle class and upper middle class to vote than the poor, that's a fundamental inequality," says Florida's Roberts.

Partly for this reason, the first online voting experiments will require voters to come to polling places rather than vote at home. One convenience, however, is that you may be able to vote at any polling place, not just your precinct. Ultimately, the fairness issue could be eased by setting up computer polls in lots of public places, including neighborhood stores, along with the traditional schools and churches.

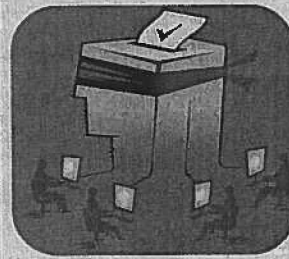
I'm enough of a skeptic about both technology and voter enthusiasm that I take with a large grain of salt some claims that Internet voting will produce a surge in citizen participation in government. But anything that makes public involvement easier is a good thing for democracy.

### WHAT ONLINE VOTING NEEDS



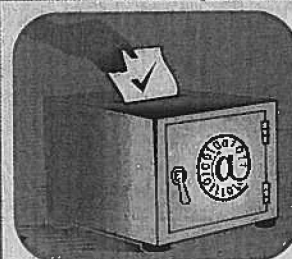
#### AUTHENTICATION

The system must be able to determine that online voters are who they claim to be.



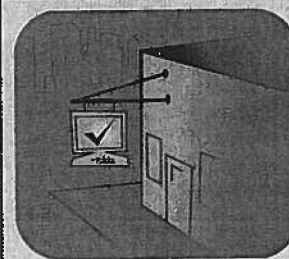
#### PRIVACY

Having authenticated voters, the system must then forget their identity to preserve the secrecy of ballots.



#### SECURITY

Ballots must be safe from electronic tampering. Voting must be protected from the sort of denial of service attacks that paralyzed commercial sites.



#### EQUITY

Steps must be taken to ensure equal voting opportunity for those who lack home computers or Internet access.

tem than the union used. Voters who sign up on a Web site are mailed a disk containing a cryptographic key and an affidavit, which they must sign and return. The

crypt your e-ballot, then encrypt the package with a different key, to generate the anonymous envelope. For extra security, the decryption key can be split up so that





## The secure Internet voting company

Located in Bellevue, Washington, VoteHere.net is the leading provider of secure Internet voting. Founded in 1996 to supply secure cryptography products for the Internet, our expertise in data security led to the development of the VoteHere Election System.

VoteHere.net's management team is internationally recognized for their leadership and expertise in the arenas of cryptography, security and online elections. Strong technical background and industry innovation combined with a proven track record of successful, secure elections, both private and public, has allowed VoteHere.net to emerge as a leader in changing the way the world votes.

VoteHere.net has recently filed a series of patents, enabling for the first time, secure public sector Internet voting. This technology meets or exceeds the high standards of present elections for privacy, security and universal verifiability. VoteHere.net expects to have its system certified for public elections this year.

Visit our website  
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3101 Northup Way, #250 ♦ Bellevue, Washington 98004

Telephone: 425.827.5156 ♦ Fax 425.739.6788 ♦ E-mail: [info@votehere.net](mailto:info@votehere.net)