



A Paper Ballot Solution

For a variety of reasons, jurisdictions are turning to paper ballots to conduct their elections, whether it is during early-voting in-person, in the polling place on Election Day, for all-by-mail elections, or to provide absentee voting. Hart InterCivic’s Ballot Now component offers a unique solution to voting using paper ballots. With Ballot Now, jurisdictions can:

- Effectively manage the printing, scanning, and resolution of paper ballots
- Begin processing/scanning returned ballots before Election Day
- Conduct a full audit of ballot resolution activities

In addition, ballots can be printed on-demand by the jurisdiction or in volume by a third-party print vendor. Best of all, Ballot Now can be a standalone paper voting system or it can be fully integrated with the Hart Voting System or another election system.

Ballot Now is a Windows-based application installed on a standard PC, and it supports off-the-shelf scanners and printers. There are no proprietary optical scanning systems, and the hardware can be upgraded easily. Results from scanned ballots are tabulated in the Hart Voting System’s Tally application and *not* in Ballot Now. Voted ballots from early voting in-person, absentee voting, and all-by-mail voting may be scanned as early as allowed by the local election code.

Ballot Now offers several options for generating and producing paper ballots, each of which is supported by a detailed, auditable record. Because these operations are not exclusive, they can be used in any combination to provide an elegant custom solution for each jurisdiction.

Ballots On-Demand or in Volume

Unlike other paper ballot systems, Ballot Now does not require ballots to be printed on templates for specific precincts or ballot styles. This eliminates the need for election officials to forecast and manage an excess inventory of ballot shells. Also, Ballot Now ballots do not require special preformatted “ovals” or other target marks that may or may not conform to a particular ballot’s requirements. Additionally, ballots can be provided in multiple languages, as required by the jurisdiction.

Header and ender cards are not required for ballot scanning. Ballot Now ballots include a barcode that identifies the precinct or ballot style. This identification eliminates the need to sort ballots before scanning, which eases the workload for the elections staff and facilitates ballot processing. Barcodes also provide security against duplicate scanning and fraudulent ballots. Ballot Now barcodes cannot be associated to an individual voter.

Ballot Now provides the capability to print and scan duplex ballots. Ballots may be printed on standard paper stock sizes. For security reasons, Hart recommends that ballots be printed on our proprietary security paper that features an “Official Ballot” watermark. Ballots are mailed to voters in standard-sized envelopes according to the jurisdiction’s requirements.

With Ballot Now, a jurisdiction can print paper ballots on-demand for distribution to voters, either in person or by mail. Election officials can print ballots on the spot in any location, whether that is the elections office, the polling place, or even special remote voting locations. Small or large quantities can be pre-printed directly from Ballot Now using the

jurisdiction's own laser printers. If desired, the ballot files can be written to an electronic PostScript file and provided to a third-party print vendor for volume ballot production. The jurisdiction stores the ballots by precinct/ballot style in a secure facility until they are mailed to the voters or delivered to the polling place. Ballot Now also interfaces with voter registration systems for voter registration-driven ballot printing.

Absentee or by-mail ballots can be produced in the elections office by a Ballot Now operator or sent to an outside vendor for bulk printing. The following examples illustrate how this can be accomplished:

- **On-demand Printing.** The precise number of ballots needed is printed on demand for each mailing to eliminate excess and to mitigate ballot storage security concerns.
- **Batch Printing by Absentee Request.** Ballots can be printed in batches after the jurisdiction compiles a list of voters who have requested absentee-by-mail ballots. Based on this list, a conversion utility is used to export and format ballot style data into a Ballot Now print queue file. The print queue file can then be imported to print the precise ballot supply in an order that matches the batch of voters requesting ballots.
- **Bulk Printing by Third-Party Vendor.** PostScript files are produced and sent to a third-party print vendor for high-speed digital printing of the requisite number of ballots. The ballots are stored by precinct/style in a secure facility until they are mailed to voters. Ballots are printed on demand for any supplemental mailings.

GENERAL ELECTION Sample County November 04, 2008		Precinct 003	
Voter Instructions: Please use a blue or black ink pen to mark your choices on the ballot. To vote for your choice in each contest, completely fill in the box provided to the left of your choice. To vote for a write-in candidate, completely fill in the box provided to the left of the words "Write-In" and write in the name of the candidate on the line provided.		County Commissioner Precinct 4 Vote for one <input type="checkbox"/> Walt Whitman Historical Party <input type="checkbox"/> Pandora Ancient Party <input checked="" type="checkbox"/> Write-In <i>John Adams</i>	
President Vote for one <input checked="" type="checkbox"/> Abraham Lincoln Historical Party <input type="checkbox"/> Helen of Troy Ancient Party		City Council Vote for two <input checked="" type="checkbox"/> Sojourner Truth <input checked="" type="checkbox"/> Mark Twain <input type="checkbox"/> Harriet Tubman	
United States Representative Vote for one <input type="checkbox"/> Susan B. Anthony Historical Party <input type="checkbox"/> Cleopatra Ancient Party		Proposition 1 To declare Key Lime Pie the official dessert of Election Day. Vote For or Against <input checked="" type="checkbox"/> For <input type="checkbox"/> Against	

Paper ballots for use in the polling place can be printed through an electronic interface with the list of eligible voters. Jurisdictions can accomplish ballot printing from the voter registration list in a number of ways:

- **Ballot Printing from Print Queue File.** Ballots can be printed individually in the polling place for each voter after he or she is authorized to vote. Using a conversion utility, a ballot style output file is formatted into a Ballot Now print queue file. This file signals Ballot Now to print the precise ballot style for each voter.
- **Ballot Printing Based on Voter Eligibility Receipt.** Ballots can be printed individually in the polling place based on ballot style data in the electronic poll book. After a person is authorized to vote, he or she is given a receipt confirming eligibility to vote and listing the appropriate ballot style. The voter takes the receipt to the ballot supply judge operating Ballot Now. The judge simply clicks on the appropriate ballot style to print the voter's ballot.

Boulder County, Colorado, with approximately 197,000 registered voters, uses Ballot Now to manage paper ballot voting for by-mail voting as well as absentee, early, and Election Day voting. In addition to Ballot Now's other capabilities, the County uses a ballot-on-demand integration function during early voting.

Because of Ballot Now's print-on-demand capabilities, Skamania County, Washington, has eliminated the ballot production delays they had experienced with their previous voting system. In turn, the County now produces ballots that are easier for the voters to understand and mark.

Digital Scanning Provides Maximum Efficiency

The Hart Voting System is the only all-digital voting system on the market. Digital processing means increased efficiency in ballot processing because scanning and digital imagery contribute to increased freedom from ballot sorting.

The returned paper ballots (absentee/by-mail and Election Day) are processed using commercially available scanners. Processing includes ballot scanning, cast vote data extraction, and delivery of cast vote data to Hart's Tally application for tabulation.

Ballot Now scans all ballots without halting the scanning operation to resolve questionable or unclear ballots. The electronic images of ballots requiring resolution are automatically stored until election officials decide it is time to examine them. This means that scanners work constantly at their full, rated speed. Multiple scanners can be used for additional capacity.

Ballot Now also includes an on-screen, color-coded ballot resolution feature that increases the efficiency and accuracy of ballot resolution and avoids the necessity to alter the original paper ballot in any way. Ballot Now identifies ballots requiring resolution (write-ins, mismarks, overvotes, undervotes), according to parameters set by the state election code and local election officials. Resolution occurs by reviewing the ballot's digital image on the computer screen to record write-in votes or resolve questions of voter intent. As issues are resolved, election officials use a simple menu-driven interface to make and record decisions. An audit log, including the user ID, records all resolution decisions and provides a complete record of the resolution process.

Unlike optical scanning systems, there is no requirement for precise registration marks on the printed ballots, thus reducing the margin for error in ballot production. Ballot Now automatically adjusts for skewed or damaged ballots, and identifies all marks within the target zone.

Ballot Now can read folded, crumpled, or creased ballots. The system may reject a ballot with a torn or altered barcode. Because digital imaging technology accommodates a wider range of problem ballots – including damaged ballots – election officials do not

have to reproduce a ballot so that it may be scanned. All resolution is accomplished on-screen; election officials do not need to alter or handle the paper ballots. All ballots are preserved in original form, without alteration. If re-evaluation of the voter's intent is required, all actions taken in ballot resolution are recorded with descriptive detail in the Ballot Now audit log, providing a traceable record of events all the way back to the individual ballot (but not the voter).



Because of Ballot Now's unique ballot resolution functionality, the application supports a wider range of voter markings than typical optical scan systems, thereby ensuring that the intent of the voter is clearly recognized. The paper-based nature and flexibility of the Ballot Now component allows voting to be accomplished in almost any environment without affecting the system's ability to ensure 100-percent accuracy in capturing and recording votes.

Hart customers have designed a variety of Ballot Now configurations, thanks to the flexibility offered by its central count scanning and resolution functionality. Because the Ballot Now application does not tabulate votes, the processing and scanning of returned ballots can begin well before Election Day, as allowed by local election law. This option allows for significant boons in time management before and on Election Day.

In Orange County, California (serving nearly 1,500,000 registered voters), Ballot Now revolutionized the absentee balloting operation. Working in conjunction with Pitney Bowes, Hart developed the nation's largest all-digital absentee electronic voting system for Orange County.

Ballots and voting instructions, printed in any of the five languages offered by the County, are available for mailing as soon as the ballot is finalized. Each

voter's ballot is barcoded and digitally imaged before being mailed. Ballots and voting instructions are automatically processed for mailing. Returned ballots are scanned and digitally imaged to make sure that the correct ballot has been returned, then sorted and stored to be tallied on Election Night. Problem ballots – such as those where the voter's signature doesn't match the original request, or where the incorrect ballot is in the return envelope – are identified so they can be resolved. The barcoding ensures that each ballot is counted only once; the system rejects a ballot if it is re-submitted.

The entire process is managed by about 10 employees working regular business hours – a huge savings in time and manpower over the County's previous system.

Designed to Grow as Needs Grow

Ballot Now supports a variety of digital scanners and lasers printers, offering processing speeds and features that meet a wide range of requirements. Hart includes only best-in-class commercial hardware, from such manufacturers as Dell, Kodak, Fujitsu, and Hewlett Packard, for scanning and print purposes. The Ballot Now component does not require any proprietary hardware for either

on-demand ballot production or the processing of paper ballots. This also means that higher-volume printers and scanners may be added as a jurisdiction's needs increase.

Since Ballot Now utilizes a wide variety of off-the-shelf scanners, the ballot throughput rate can be scaled for specific customer needs. The throughput rates for the scanners recommended for use with the Hart Voting System are listed in the table below. Actual throughput under field conditions depends primarily the size of the ballot and the efficiency of ballot processing to maintain the flow of ballots to the scanner. Hart has experienced a slightly lower operational throughput for these scanners.

It is important to note that scanner throughput rates are only one factor in the ballot processing equation. Other key factors include efficient design and execution of workflow processes, batch size management, workspace/facility layout, and supervisory attention. With some concentrated effort in these areas, throughput can be enhanced dramatically, and Hart's system design, training, project management, and continuing support are all structured specifically to help our customers achieve efficient, secure, and consistent performance in all areas of operation.

Scanner	Recommended Daily Volume	Rated Throughput Speeds (based on 200 dpi, landscape, 8.5x11-inch documents)
Kodak i260	Up to 5,000 pages per day	50 pages per minute / up to 100 images per minute
Kodak i610	Up to 80,000 pages per day	80 pages per minute / up to 320 images per minute
Fujitsu M4099D	Up to 15,000 pages per day	90 pages per minute
Kodak i640	Up to 100,000 pages per day	100 pages per minute / up to 400 images per minute
Kodak i660	Up to 120,000 pages per day	120 pages per minute / up to 480 images per minute
Kodak i830	Unlimited (typical document volumes range from 12,000 to 60,000 pages per 8-hour shift)	160 pages per minute

Fast, Flexible Reporting

Official election results are obtained from Hart's Tally tabulation and reporting application. Tabulation results from Ballot Now are easily integrated with voting results from other components of the Hart Voting System. An integration utility may also be used to allow a jurisdiction to import voting results from other voting system into the Tally application. Tally produces several standard reports, any of which may be exported in PDF, HTML, and other standard formats, for dissemination digitally or by paper copy.

The City of Philadelphia, Pennsylvania, uses the Ballot Now component to manage absentee ballot design, printing, scanning, and tabulation. After the ballots are scanned (using off-the-shelf equipment) and tabulated, Hart's Tally application integrates with the Danaher Guardian system to import results from Tally for reporting vote totals. The City produces a single report that includes both the Election Day and absentee voting totals.

Since implementing Ballot Now in early 2005, Clallam County, Washington, has been able to take full control their pre-election process and improve their ballot generation and tabulation processes. The County takes advantage of the Hart Voting System's reporting capabilities. Several results reports available through the Tally application are saved and uploaded to the County's Web site to increase election transparency for its citizens. The County also posts a sample ballot produced in Ballot Now on its Web site.

Secure and Auditable Elections

Jurisdictions can be assured of a secure system at every stage of the election process. The Hart Voting System was designed with integrated security features, including automatic verification and authentication processes for the output of each component through multiple, independent data paths through the system.

Additional security for Ballot Now, as well as the other Hart Voting System software applications, is provided by the eSlate Cryptographic Module (eCM), a physical security device. This electronic device is required for access to secure functions in the BOSS, Ballot Now, and Tally applications. Before allowing access to the Hart Voting System applications, each

eCM device requires an encrypted device ID, signing code, and a PIN or password.

Security features include the following:

- The Hart Voting System has no connection to the Internet.
- The system creates an audit record anytime it is accessed or information is changed. All audit records can be extracted and printed in hard copy. All audit reports, audit trail documents, databases, and final reports may be archived in hard copy and/or saved electronically to CD-ROM as needed.
- Data cannot be altered or changed by unauthorized personnel because the database structure is proprietary and protected by encrypted passwords. The election officials in each jurisdiction control these passwords.

Ballot Now has secure internal audit logs and creates an electronic image of each ballot that can be securely and safely stored to create a permanent record of the election. The paper ballot is maintained in its original format, unlike optical scan systems that require election officials to physically alter the paper ballot so it can be scanned.



Continual improvement in the security of its products is a basic design and development objective for Hart InterCivic, as is responding to changing customer requirements and market demands. Security takes into account not only technology, but also people and processes. In addition to the security of the Hart Voting System itself, our customers provide many layers of security including chain-of-custody monitoring, parallel testing, logic and accuracy

testing, auditing, physical security, law enforcement assistance, etc.

Ballot Now provides transparency to the election process to ensure the legitimacy of election results. In May 2007, the City of Long Beach, California, successfully conducted a Special Municipal Election using the using Ballot Now. On Election Night, candidates were able to more freely observe the scanning of ballots and the resolution of problem ballots. The City elections staff benefited from the full audit capabilities available in Ballot Now.

Since implementing Hart's Ballot Now component in 2003, Skamania County, Washington, reports experiencing faster, more accurate, and more secure tabulation of election results.

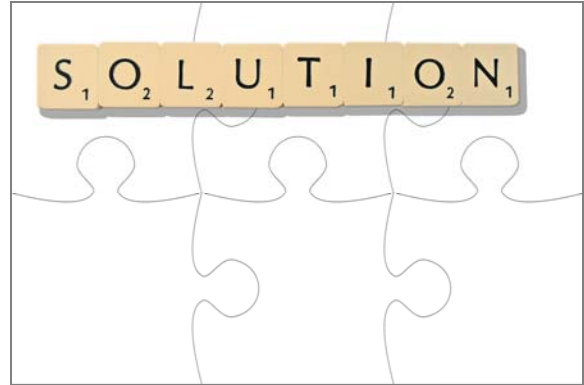
Close Races and Best Practices

With elections under continued scrutiny, what happens if a jurisdiction's highly publicized contest is decided by just a few votes? Orange County, California, knows first hand. The County has experienced more close elections in the past three years than any other county in the state of California. This has given the County a unique perspective into the impact of proper preparation and planning when using Hart's Ballot Now application.

In February 2007 an Orange County Board of Supervisors race was conducted under tremendous national media scrutiny. This was the first time two Vietnamese-American candidates were only a handful of votes apart for one of the top jobs in the County. Following Election Night, the gap narrowed as final votes were tallied. After final certification, the distance between the two candidates was a mere seven votes.

A recount was requested, and the elections office used detailed planning and sorting to prepare for the recount. It quickly became clear that voters made numerous distinguishable marks on their ballots. California law required Orange County to make a determination on each disputed ballot – while surrounded by the State's top election attorneys, the news media, and an anxious Board of Supervisors. The vote count ended up just three votes apart. The controversy surrounding the results of the recount election was brought before the Orange County Superior Court. After the trial, the court upheld the decisions Orange County made on how Ballot Now

was used and how the elections office prepared for the election.



Conclusion

Hart's customers have chosen Ballot Now to manage elections where paper is the only option or where paper is offered to voters as an alternative. This includes all-by-mail elections, paper provisional ballots, and early and Election Day voting using paper ballots in the polling place.

A number of ballot printing options are available to jurisdictions that need to provide paper ballots to their voters. Ballot Now's flexibility lets you take advantage of the one that best suits your jurisdiction's needs:

- Print paper ballots in-house. Supplement as needed with additional on-demand printing for delivery by field support personnel or mailing to voters.
- Produce PostScript files of the ballots for third-party, high-speed digital printing in volume for use in the polling place or to be mailed to voters.
- Print on demand the correct ballot for each voter in the polling place or for by-mail voting.

Ballot Now is a cost-effective paper ballot solution. The digital imaging technology utilized by Ballot Now cuts printing costs and makes ballot scanning a fast, efficient process. In addition, digital technology is more accurate and secure than optical scanning systems. The use of standard, commercial off-the-shelf computers, printers, and scanners keeps equipment purchase and maintenance costs at a minimum.

Whatever your paper ballot needs, Hart InterCivic's Ballot Now solution can help you meet those needs with added security, accuracy, and efficiency.

How Hart Customers Use Ballot Now

The Ballot Now paper ballot component of the Hart Voting System has been successfully implemented in jurisdictions of all sizes. The following table lists a sampling of Hart's customers and the manner in which they incorporate Ballot Now into their election process.

Jurisdiction	Registered Voters (Approx.)	How Ballot Now Paper Ballots are Used	Customer Since
California			
City of Long Beach	211,075	Election Day voting in the polling place; scanned in central count	2007
Orange County	1,497,397	Absentee-by-mail voting; scanned in central count	2003
Yolo County	94,000	Election Day voting in the polling place; scanned in central count	2006
Colorado			
Boulder County	162,826	Absentee, early, and Election Day voting in even-year elections; scanned in central count and in the polling place All-by-mailing voting in odd-year elections; scanned in central count	2004
Cheyenne County	1,671	Absentee and Election Day voting; scanned in central count	2006
Garfield County	26,032	Absentee and Election Day voting; scanned in central count and in the polling place	2006
Montrose County	22,072	Absentee and Election Day voting; scanned in central count	2006
Ohio			
Hamilton County	568,370	Absentee and Election Day voting; scanned in central count and in the polling place	2006
Oregon			
Curry County	13,475	All-by-mail voting; scanned in central count	2007
Yamhill County	46,137	All-by-mail voting; scanned in central count	2007
Pennsylvania			
Lancaster County	231,391	Election Day voting; scanned in the polling place	2006
City of Philadelphia	1,011,149	Absentee-by-mail voting; scanned in central count	2003
Texas			
Aransas County	15,556	Absentee and Election Day voting; scanned in central count and in the polling place	2006
Brooks County	6,151	Absentee and Election Day voting; scanned in central count and in the polling place	2005
Denton County	321,700	Absentee and Election Day voting; scanned in central count and in the polling place	2005
Gregg County	73,544	Absentee and Election Day voting; scanned in central count and in the polling place	2005
Harris County	1,900,000	Absentee-by-mail voting; scanned in central count	2001
Kenedy County	349	Absentee-by-mail voting; scanned in central count	2005
Tarrant County	918,656	Election Day voting; scanned in the polling place	2001
Virginia			
City of Charlottesville	18,841	Absentee and Election Day voting; scanned in central count and in the polling place	2002
Washington			
Benton County	79,017	All-by-mail voting; scanned in central count	2005
Clallam County	43,519	All-by-mail voting; scanned in central count	2005
Clark County	194,211	All-by-mail voting; scanned in central count	2005
Okanogan County	19,737	All-by-mail voting; scanned in central count	2005
Skamania County	6,343	All-by-mail voting; scanned in central count	2004
Yakima County	93,820	All-by-mail voting; scanned in central count	2004