Election Workflow Automation

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Agenda

- Introduction
- Dominion and e-Voting
- Election Cycles and Events
- Dominion Democracy Suite™
  - Elector Management
  - Election Event Management
- Traditional Voting
- Remote Voting
- Current Work - Canadian and US Elections
- Q&A
Introductions

- Main office - Toronto, Canada.
- Offices in Montreal, Calgary, Chicago, Ohio, Belgrade.
- Primary focus – Canada and USA (for now)
- R&D – 75%, PhD and M.Sc. – 50%
- National Level (Canada)
  - 308 ridings, Everywhere Voting™
- Provincial Level
  - Real-time voter strike-offs
  - Elector management
  - Provincially approved tabulation equipment
- Municipal Level
  - Coast to coast – British Columbia, Alberta, Ontario, Quebec, New Foundland
  - Tabulation, electronic remote voting, vote by mail
  - Real-time voter strike-offs
  - Elector management
  - Variety of election services
- Partners – Microsoft, Cisco, Bell&Howel, DMTII, MPAC, Automark, Canada Post, Datafix, …
Dominion and e-Voting

- e-Voting ≡ Internet Voting (usually)
- If ‘e’ means electronic than e-Voting means much more than Internet voting
- In essence we have tried to automate and computerize every aspect of the election process
- Internet Voting is just a subset of the Remote Voting together with Vote by Mail, telephony voting, fax-back voting, etc.
- Traditional voting will be in use for years.
- This is why we have worked on integrated, automated election workflow – Democracy Suite™.
Election Cycles & Election Events

Within the election event interval, some data cannot be changed.

When defining an election event, the event-specific working set of election entities has to be initialized.

When closing an election event, the current working set of election entities is copied to form the history of the closed election event.

No overlap between events.
Dominion Democracy Suite™

Variety of products and services

- Everywhere Voting™
- Elector Management
- Real-time Voter Strike-offs
- Election Event Management
  - Election Event Definition
  - Election Event Designer
  - Ballot Designer
  - Results and Tally
- Ballot Tabulation
- Remote Voting – Internet, mail, fax
- Results Publishing
- Election Store (www.theelectionstore.com)
- Election Human Resources
- Election Customer Portal
Dominion Election Workflow
Elector Management

Elector Management with Voter Strike-offs
Elector Management

- Interface with external data
- NRC (notice of registration cards) creation
- Cleanse data
  - Cleansing of elector and address data
  - Data comparisons & resolutions
- ‘Where should I vote?’
- Elector list maintenance
- Updated elector lists
- Remote voting support
- Real-time voter strike-off support
- Extensive reporting capability

Create & manage your own permanent list of electors
Elector Management 1
Where Should I Vote?
Real-time voter strike-offs

- Every name on every voter list
- Real-time poll connectivity
- Minimize scope of fraud
- Client-server database synchronization
- Integrated with Elector Management
- Electronic poll-book

The only practical solution to everywhere voting
Elector Management Deployment 2

Democracy Suite Elector Management with Voter Strike-off Deployment Scenario
Elector Management Deployment 3
Election Event Management

Election Event Definition Files Exchange Diagram

- Event Definition
  - Online Customer Portal
- Internet
- Democracy Suite
  - Election Customer Portal
  - Web Server
- Results Publishing
  - Web/FTP Server
- Event Definition
  - Ballot Designer
  - Tally and Reporting
- Democracy Suite
  - Event Definition Server
- Democracy Suite
  - Internet Voting Server
  - Fax/Email Server
- Democracy Suite
  - Election Event Database
- Electronic Ballots
- Flash Files
- XML Files
- Binary Configuration Files
- Ballot Image Files
- Paper Ballots
- CF500 Series
- CF200 Series
Election Event Definition

On-line service

Allow election officials to:
- Election event
- Geography information
- Polling stations
- Contests
- Candidates
- Ballots
- Export XML
Election Event Designer

- Initialize Election Event
- Import election definitions from Election Event Definer (XML)
- Encode all automated equipment
- Create results database
- Create ballots
Results Tally and Reporting

Single point gateway to the public

- Acquire results
  - From all voting locations
  - From all voting channels
- Release results
  - Set check flags for sanity checks
  - May be configured to withhold release of any poll result
  - Automatically releases reporting files to FTP site
- Results auditing
  - Every/any ballot image can be inspected
Election Results Publishing

- Election results are automatically reported to any public forum
  - City website, local news media
  - Council chambers
- Results transmitted in real time
- XML schema
Paper Ballots Tabulation

- **Poll Tabulation – CF200 Series**
  - High resolution image scanner
  - Saves every ballot image
  - Completely repeatable
  - No restrictions (‘X’, “√”, “←”, “○”)
  - Integrated audio accessibility
  - Ballot size up to A3, double sided

- **Central Tabulation – CF500 Series**
  - Same features as poll tabulation
  - 6000 ballots per hour (actual)
  - Very high throughput
  - Ballot size up to A3, double sided

Decentralized and centralized ballot tabulation solutions for traditional paper-based voting
Accessibility

- **Universal suffrage**
  - (def) the right to vote, to all adults, without distinction as to race, sex, belief, or social status.
    - privileged men ➔ all men ➔ woman ➔ Asians ➔ native people ➔ inmates ➔ homeless (1867-2003)

- **Universal access**
  - The right to *a private* vote, to all adults, without distinction as to race, sex, belief, social status or *physical ability*
    - Universal access to Canadians (2003)
Is the mark a vote?

Election officials define what should be considered as a vote

- Is this a vote?
- Is this a vote?
- Is this a vote?

- Make the smallest mark you count as a vote ($X\%$)
- Make the largest mark you don’t count as a vote ($Y\%$)
Ballot watermarking

- Patented technology
- Every ballot is saved – paper of electronic
- Ballot signature contains information about:
  - Voting marks for every contest
  - Pixel counts
- Supports preferential voting
- Supports write-in candidates
- Useful for logic and accuracy (L&A) testing
- Key for unquestionable auditing
- Eliminates recounts
Remote voting

- Internet Voting
  - Easy, quick & slick
  - Can not be used as the only voting channel
  - Very convenient for those who can use it
  - Can vote last minute
  - Browser independent
  - In Canada – City of Markham (2003, ES&S), City of Peterborough (2006, Dominion)

- Vote by Mail
  - Most accessible remote voting method
  - Voters mark traditional paper ballots
  - Centralized ballot tabulation

Maximize # of voters, not the # of votes
Electronic Remote Voting 1

**PHASE 1**

- Elector Management Database
- Elector Management Application Server
- Notice of Registration Cards

NRC Contains:
- Elector name and address
- Elector ID
- Poll ID
- Polling Location Address
- Instructions to register for remote voting services - Internet Voting Service, Vote-by-mail, etc.

**PHASE 2**

- Elector
- Request to vote by Internet (Name, Email address, Elector ID and Poll ID)
- Secure mail envelope
- Encrypted email

- Election Official
- Elector Registration Server
- Elector Management Application Server
- EIN

*Elector Identification Number - EIN*
String of unique 6 to 12 alphanumeric characters

**Internet Voting Workflow (part 1)**
Electronic Remote Voting 2

**PHASE 3**
- Elector
- Ballot Issuing Server(s)
- Ballot and Voting Definition Files
- Electronic Ballot
- HTTPS/SSL
- Election Event Application Server
- Democracy Suite Election Event Database

**PHASE 4**
- Elector
- Voting Box Server(s)
- Encrypted and hashed voting information
- Electronic Ballot (with audio and magnification features for visual impaired)
- Results Files
- Electronic Ballot Images
- From other voting channels
- Democracy Suite Election Event Database
- Election Event Application Server
- Democracy Suite Data Acquisition Manager

**PHASE 5**
- Election Results Live Web Streaming
- Results Files
- Democracy Suite Results Gatekeeper
- Results verification, auditing and publishing

*Internet Voting Workflow (part 2)*
Internet Voting Registration

Welcome, John Smith (Elector ID: 0000195167)

Please type in your address as printed on your Notice Of Registration card (NRC)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street number *</td>
<td></td>
</tr>
<tr>
<td>Street name *</td>
<td></td>
</tr>
<tr>
<td>Direction *</td>
<td></td>
</tr>
<tr>
<td>Unit type / number *</td>
<td></td>
</tr>
</tbody>
</table>

Please type in additional information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of birth</td>
<td></td>
</tr>
</tbody>
</table>

Please select Personal Identification Number (PIN) delivery method

- [ ] Regular Mail
- [ ] Electronic mail

Enter e-mail

Confirm e-mail

Please select ballot type

- [x] I prefer a regular ballot.
- [ ] I prefer a ballot for the visually impaired which supports text magnification and audible candidate names.

If your application to vote by Internet is approved, you will receive a PIN. You will then need this PIN to view an electronic ballot.

Fields required for successful login are marked with *.

Reset  Submit
Internet Voting Login

City of Peterborough
2006 General Local Election

On Line Services - Internet voting login

Please type in your personal information to access and cast Internet ballot

Enter Elector ID from your Notice of registration card (NRC) *

Enter your Personal Identification Number (PIN) *

If you can't read the security code, generate a new one.

Enter the security code shown above *

Fields required for successful login are marked with *. 

Reset  Submit

For more detailed instructions, download Quick Start Guide (PDF)
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Electronic Ballot 1

City of Peterborough
Municipal Elections - City of Peterborough General Election

for the office of City Councillor

You are entitled to vote for 6 candidate(s) for this office.

Robert L. BORDON
Henry HUDSON
Jean CABOT
Jacques CARTIER
George DADAMO
Leif ERIKSSON
Jake JOLLET
William L.M. KING
Elliot LAWSON
John A. MACDONALD
Kristine MAROW
Nellie MCCLUNG
Lucy M. MONTGOMERY
Michael NELSON
Steve OSBORNE

John PAGE

Lester B. PEARSON
Mary PICKFORD
Fanny ROSENFIELD
Louis SAINT-LAURENT
Pierre E. TRUDEAU
Clause VON ESPIE
Adam WIGLEY
Bonny ZHANG

Step 2 of 3

HELP CLEAR PREVIOUS NEXT

dominion VOTING
## Electronic Ballot 2

### City of Peterborough

#### Municipal Elections - City of Peterborough General Election

**District 1**

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#### For the office of City Councillor

You are entitled to vote for 6 candidate(s) for this office.

<table>
<thead>
<tr>
<th>Candidate Name</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert L. Bordon</td>
<td>✗</td>
</tr>
<tr>
<td>Henry Hudson</td>
<td></td>
</tr>
<tr>
<td>Jean Cabot</td>
<td></td>
</tr>
<tr>
<td>Jacques Cartier</td>
<td></td>
</tr>
<tr>
<td>George Dadamo</td>
<td></td>
</tr>
<tr>
<td>Leif Eriksson</td>
<td></td>
</tr>
<tr>
<td>Jake Joliet</td>
<td></td>
</tr>
<tr>
<td>William L.M. King</td>
<td>✗</td>
</tr>
<tr>
<td>Elliot Lawson</td>
<td></td>
</tr>
<tr>
<td>John A. MacDonald</td>
<td></td>
</tr>
<tr>
<td>Kristine Marow</td>
<td></td>
</tr>
<tr>
<td>Nellie Mcclung</td>
<td></td>
</tr>
<tr>
<td>Lucy M. Montgomery</td>
<td></td>
</tr>
<tr>
<td>Micheal Nelson</td>
<td>✗</td>
</tr>
<tr>
<td>Steve Osborne</td>
<td></td>
</tr>
<tr>
<td>John Page</td>
<td></td>
</tr>
<tr>
<td>Lester B. Pearson</td>
<td></td>
</tr>
<tr>
<td>Mary Pickford</td>
<td></td>
</tr>
<tr>
<td>Fanny Rosenfeld</td>
<td></td>
</tr>
<tr>
<td>Louis Saint-Laurent</td>
<td></td>
</tr>
<tr>
<td>Pierre E. Trudeau</td>
<td></td>
</tr>
</tbody>
</table>

**Clause VON ESPIE**

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Happy voting!
Electronic Ballot 3

Information
Office of City Councillor, vote for 6 you have UNDERVOTED (4)
Office of School Trustee (EP), vote for 3 you have OVERVOTED (5)

Are you certain you wish to cast this ballot?

Yes  No

for the office of Mayor
You have selected:
John FRANKLIN

for the office of City Councillor
You have selected:
Jean CABOT
Lester B. PEARSON
Pierre E. TRUDEAU
Claude VON ESPIE

for the office of School Trustee (EP)
You have selected:
Samuel DE CHAMPLAIN
James COOK
Patricia COSTER
Jeanne MANCE
Menelaus P. O’DANIEL
Electronic Ballot Becomes Paper Ballot

- Recreate cast ballot at the back-end
- Every electronic ballot -> paper ballot
- Used for auditing
- Ballot can be printed, scanned and tabulated as any paper ballot
- Permanent record
Current Work - Canadian and US Elections

- Development of new poll-level optical tabulator – CF201
- US Certification
- HAVA compliance
- New release of EEMS – Election Event Management System – for US
- Further development on rich-client Internet ballot with data hiding techniques
- Support for smart cards for remote voting
- Further integration of GIS into Elector Management system
Election Workflow Automation

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