Weathering an Iowa Winter Using 511 – Lessons Learned
NRITS – Huntington, WV
August 3, 2010

Iowa DOT
800 Lincoln Way
Ames, IA 50010
s.stolle@dot.iowa.gov
(515) 239-1933
Overview

- Condition Acquisition and Reporting System (CARS)/511 – What is it?
- Winter 2009/2010 in Iowa: Just how bad was it?
  - Other extreme weather events in Iowa
- Winter Storms – What went wrong?
  - Coordination between IaDOT (btwn. internal offices) & ISP
  - Performance Problems & Remedies
- What’s Next?
What is CARS?
- Traffic incident reporting system
- Pooled-fund project with 10 other states.
- Feeds 511 (phone, web & HAR)
What’s reported?

- Winter road conditions (including tow bans)
- Summer construction
- Weight limits
- Width limits
- Crashes (if entered) (CAD integration coming)
- National Weather Events (warnings)
- Traffic Speeds
- More to come with SIMS project
511 Website

- 511 Splash page [http://511ia.org/](http://511ia.org/)
- HB Site [http://hb.511ia.org](http://hb.511ia.org)
- LB Site [http://511ia.org/default.asp](http://511ia.org/default.asp)
  - Will be upgraded by October (hopefully!)
- New Features recently added
  - Traffic (Google or IDOT Speed sensors)
  - Mobile
- Customized Route Alerts – Coming Soon
Low Bandwidth Site

Click or move mouse over icons to get more information

Click for Des Moines information, click on the Zoom box on the map or select Des Moines from the drop down menu.

All Current Incidents.

Closure - Interstate 80
Interstate 80 eastbound: at Exit 306: US 67
road closed due to bridge construction work -- follow the detour signs —
Comment: Scott County - Illinois Department of Transportation 1-815-284-2271
Low Bandwidth – Road Conditions

For Des Moines information, click on the Zoom box on the map or select Des Moines from the drop down menu.

Current Driving Conditions:
Travel Not Advised – Interstate 29
511 phone

- Started in November 2002
- Fed by CARS
- Free for land lines and cell phones (if your provider allows)
- Can handle up to 600 calls at one time. (shared w/other states)
- Avg. call is 2 min.
- Migrating to new IVR platform

Travel Info
Dial 511
or visit 511ia.org
Winter 2009/2010 in Iowa: Just how bad was it?

70+ inches of snow!
Snow Machine Monster

Can tackle an 8’ drift and throw 200’
2 Major Storms with Struggles

- December 8-9, 2009 Storm
  - Statewide avg. of 10.2” of snow fell
  - Largest single storm total for Iowa since January 1971 & 3rd largest storm total since 1950.
  - In Des Moines - 15.5” of snow fell (4th largest storm total since 1884).
• December 23-27, 2009 Storm
  ◦ Rain, freezing rain, and then snow.
  ◦ Snow fall ranged from 3” to 20” across the state.
  ◦ 22.1” avg. total snow fall after storm – for Dec.
  ◦ Some areas had 30”
At least this wasn’t the case…

May 27-29, 1947 Snow Storm

Key
- Trace to 1"
- 1" to 3"
- 3" to 5"
- 5" to 7"
- 7" to 9"
- 9" to 11"
- 11" to 13"

Cities and snowfall amounts:
- Harrison, NE - 12"
- Chambers (II SW), NE - 10"
- Le Mars, IA - 10"
- Appleton, WI - 8.8"
- Pine River, WI - 8.4"
- Viroqua, WI - 9"
- Gays Mills, WI - 10"
- Taylor, NE - 10"
- Winside, NE - 10"
- Alliance, NE - 12"
Other extreme weather event

- Flooding of 2008
Other extreme weather event

Flooding of 2008
Winter Storms – What went wrong?

• Since the Floods of 2008 (our last major event), CARS went to virtualized system.
  ◦ Hadn’t been through a major event
• HB site was crashing due to web hits that were unprecedented for Iowa

December Totals (phone & web)

<table>
<thead>
<tr>
<th>CALL VOLUMES for December</th>
<th>Calls</th>
<th>Minutes</th>
<th>Avg. Min/call</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>214,435</td>
<td>502,293</td>
<td>2.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Page Views</th>
<th>Unique Visitors</th>
<th>% IE Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-bandwidth</td>
<td>1,763,773</td>
<td>229,758</td>
<td>50.65%</td>
</tr>
<tr>
<td>Low-bandwidth (Winter Rd. Conditions)</td>
<td>9,261,303</td>
<td>571,815</td>
<td>71.74%</td>
</tr>
</tbody>
</table>

December Storms Web Statistics

<table>
<thead>
<tr>
<th></th>
<th>Monday (12/7) to Tuesday (12/8)</th>
<th>Wednesday (12/10) to Thursday (12/11)</th>
<th>Saturday (12/19) thru Sunday (12/27)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Page Views</td>
<td>Unique Visitors</td>
<td>% IE Users</td>
</tr>
<tr>
<td>High-bandwidth</td>
<td>149,979</td>
<td>33,412</td>
<td>72%</td>
</tr>
<tr>
<td>Low-bandwidth (Winter Rd. Conditions)</td>
<td>644,010</td>
<td>72,200</td>
<td>74%</td>
</tr>
</tbody>
</table>
What went wrong? (cont’d)

- LB site was not updating – showing old road conditions/closures
  - Truckers (oversize loads) & tow bans depend on info.
- Long downtime when re-booting servers
- Coordination between IaDOT (btwn. internal offices) & ISP
- 5-1-1 phone system had some minor hiccups
- How do we report winter closures on non-ISP roads?
How did we deal with the problems?

- **Between the 1\textsuperscript{st} & 2\textsuperscript{nd} storms in December**
  - Castle Rock did some reconfiguring of the load balancing software
  - Separated the backend and public site servers
  - Added 4 more physical servers (bringing the total to 6)
  - Improved backend server reboot time from 5 hours to 20 minutes.
  - Changed the 511 splash page LB link to go directly to the LB Winter Road Conditions map.
  - Looked at ways we could get road closures due to winter weather to show up on Road Conditions map.
• During 1st half of the 2nd Storm (Sun. thru Tues)
  ◦ MN & IA experienced same storm - CR separated the 2 states onto their own servers and were paired with a non-storm/low-demand CARS state.
  ◦ Started exploring “cloud computing” for high demand times.
  ◦ Text-only version of road conditions was created by IDOT's web dev. team for public use.
  ◦ A redirect page was developed in case we needed to shut down the HB website.
  ◦ The note “Due to heavy demand on the High Bandwidth website you may be automatically redirected to the Low Bandwidth site.” was added to the splash page.
  ◦ Anyone using IE and accessing the splash page was automatically redirected to the LB Winter Road Conditions. HB site was still accessible using a bookmark or clicking on the HB link on the Winter Road Conditions site.
Welcome to 511 Traveler Information

Due to heavy demand, Iowa DOT’s 511 high-bandwidth website is temporarily unavailable to Internet Explorer browser users. However, you can access the high-bandwidth website with a browser other than Internet Explorer (free and available for the PC and Mac): Firefox Chrome Safari

If you do not wish to use a different browser, you may proceed to our low-bandwidth website, which uses the same information source as the high-bandwidth website. Please select from the links below:

Select:

**Winter Road Conditions**
- Statewide winter road conditions
- Roadway colors indicate current road conditions
- 5-minute updates

**All Advisories**
- All current reports, including statewide winter road conditions.
- 5-minute updates
Welcome to 511 Traveler Information

Iowa's high-bandwidth 511 web site is temporarily unavailable due to heavy usage. To access current information using our low-bandwidth web site, which uses the same information source as the high-bandwidth web site, please select from the links below.

Select:

Winter Road Conditions
- Statewide winter road conditions
- Roadway colors indicate current road conditions
- 5-minute updates

All Advisories
- All current reports, including statewide winter road conditions
- 5-minute updates
• **During 2nd half of the 2nd Storm (Weds. thru Christmas weekend)**
  - Once IE users were redirected to the LB website, the HB site was up and running without major struggles.
  - Big Relief.....

• **Throughout the rest of the winter storms** (and there were many) looked at ways to make efficiencies in the HB system and, at the direction of Management, make our LB site as indestructible as possible.

• IaDOT Operations Center & State Patrol coordinated weather closure reporting.
• Tweaked CARS so certain closures would show up on LB Road Conditions Map.
• Kept the lines of communication open with our Media office.
  ◦ Helped get the word out during difficult times
  ◦ Made suggestions based on public comments
• Worked with State Patrol in improving accuracy of Road Condition reporting to maintain public confidence.
What’s Next?

- Re-Vamping Low Bandwidth website
- Hired a VMWare expert consultant to evaluate CR’s hardware/software configuration.
- Purchasing approximately $300,000 worth of hardware & software.
- Expanding mobile website along with publicized launch
- Pilot project for Iowa with cloud service provider
- Building out Rancho Cordova, CA facility for redundancy/high availability
Upgrading Des Moines Cameras

- Will help public
- All cameras are being upgraded this summer (about half done)
- Will have streaming video for the public
- Old cameras will be placed around rural Iowa
Who will benefit the most from SIMS?

- Our new-ish 24/7 Operations Center
- Located in Ames
- Started in Nov ’08
• Shooting for most improvements to be done by October 2010. Too optimistic?