Agenda

1. MS2 Overview
2. TN-TIMES Project
3. TCDS/HPMS Features
4. Q&A
Pioneer and National Leader of cloud-based TDMS used by more than 250 agencies in 30 states, including DOTs, MPOs, counties and cities
Over 250+ Users

- City 125
- County 49
- MPO 61
- State DOT 22
- Institution 4
22 State DOT Clients
Agenda

1. MS2 Overview
2. TN-TIMES Project
3. TCDS/HPMS Features
4. Q&A
Modern Traffic Analytics

https://TDOT.ms2soft.com
Proposed Modules

- TCDS
- HPMS
# Traffic Data Modules/Extensions

<table>
<thead>
<tr>
<th>Modules and Extensions</th>
<th>License Type</th>
<th>Included</th>
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<tr>
<td>TCDS (Traffic Count)</td>
<td>Enterprise (unlimited agency users)</td>
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<td>Data Backup API</td>
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<td>WOTS (Work Order)</td>
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<td>ESTS (Equipment Status)</td>
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# Project Schedule

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<th>Task</th>
<th>Aug</th>
<th>Sept</th>
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<td>Go-Live for Production Site</td>
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<td>License, Hosting, Maintenance &amp; Support Begins</td>
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</table>
Agenda

1. MS2 Overview
2. TN-TIMES Project
3. TCDS/HPMS Features
4. Q&A
Traffic Data Functions

- Device Polling
- Raw File Upload
- Automated Quality Control (QC)
- Comprehensive Reporting
- Annual Statistics and Factoring
- Monthly TMAS Exports
- Annual HPMS Reporting
Multiple User Levels

Modern Traffic Analytics

USER LEVELS

SITE MANAGER
- User management
- All admin user rights

ADMINISTRATIVE
- Edit/upload data
- All login user rights

DOT Staff

Stakeholder/Agency Staff

USER (w/login) - View all data/reports
PUBLIC (w/o login) - View selected data

http://agency.ms2soft.com
Traffic Data Processing

Short Count Upload and QC
- Volume
- Speed
- Class*

Factor Grouping
- Seasonal
- Axle
- Growth

Continuous Count Upload and QC
- Volume
- Class
- Speed
- WIM

Group Assignment
- Seasonal
- Axle
- Growth
- Class
- WIM

Factor Development
- AADT
- Seasonal
- Axle
- Growth

Monthly TMAS Exports
- Station
- Volume/Class/WIM
- Speed/PVR

Short Count AADT Back-Processing
- Compute AADT
- Estimate AADT

Annual HPMS Reporting
- AADTs
- K/D factors
- SU/CU Truck %
- Vehicle summary
- Metadata

* Class counts are used in axle factor grouping and development
• Auto Assign
• Auto QC
• Failure Recovery
Automated QC

- Customizable QC Groups and Parameters
- 20+ QC Rules
- Ad-hoc QC Rules
- On-Demand Re-QC

Modern Traffic Analytics
QC Process

Upload Count Files
- Volume
- Speed
- Class
- Per Vehicle
- WIM

Validate File Format

- Data Check – Fatal Flag
  - No Station ID
  - Duplicates
  - Incomplete

- Data Check – Critical Flag

- Data Check – Warning Flag

- Data Check - Passed

Review Uploaded File Status (Admin Area)

Review Data in Assigned List (Admin Area)

Review Data Count Status: Pending Review – QC Failed

Count Status: Accepted (with Note)

Count Status: Accepted
Ad-Hoc QC Rule Engine

- If a "RuleAction" is 1, a vehicle violating the rule will be marked as Invalid.
- The "RuleCode" field uses error codes with an E appended for Error, W for Warning.

<table>
<thead>
<tr>
<th>RuleSetId</th>
<th>RuleCode</th>
<th>RuleName</th>
<th>RuleExpression</th>
<th>RuleAction</th>
<th>IsActive</th>
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<tr>
<td>2</td>
<td>31W</td>
<td>Axle Count High Warning</td>
<td>item.NumberOfAxles &gt; 14</td>
<td>0</td>
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<tr>
<td>2</td>
<td>31E</td>
<td>Axle Count High Error</td>
<td>item.NumberOfAxles &gt;= 20</td>
<td>1</td>
<td>True</td>
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<tr>
<td>2</td>
<td>30E</td>
<td>Axle Count Low</td>
<td>item.NumberOfAxles &lt;= 1</td>
<td>1</td>
<td>True</td>
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<tr>
<td>2</td>
<td>35W</td>
<td>Axle Spacing High Warning</td>
<td>item.AxleSpacingMax &gt;= 30</td>
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<tr>
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<td>35E</td>
<td>Axle Spacing High Error</td>
<td>item.AxleSpacingMax &gt;= 90</td>
<td>1</td>
<td>True</td>
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<tr>
<td>2</td>
<td>32W</td>
<td>Axle Spacing Low Warning</td>
<td>item.AxleSpacingMin &lt;= 3</td>
<td>0</td>
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<tr>
<td>2</td>
<td>32E</td>
<td>Axle Spacing Low Error</td>
<td>item.AxleSpacingMin &lt;= 2</td>
<td>1</td>
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<tr>
<td>2</td>
<td>26E</td>
<td>Axle Weight &lt;= GVW</td>
<td>item.TotalWeightOfVehicle &gt; 0 &amp; (Math.Abs(item.TotalWeightOfVehicle - item.SumOfAxleWeights) / item.TotalWeightOfVehicle) &gt;= (decimal) 1</td>
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<td>2</td>
<td>42E</td>
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<tr>
<td>2</td>
<td>41E</td>
<td>Axle Weight Low</td>
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<tr>
<td>2</td>
<td>24E</td>
<td>Axles vs Spaces</td>
<td>item.NumberOfAxleWeights = item.NumberOfAxleSpacings + 1</td>
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<td>True</td>
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<tr>
<td>2</td>
<td>27E</td>
<td>Axles vs Total Axles</td>
<td>item.NumberOfAxleWeights = item.NumberOfAxles</td>
<td>1</td>
<td>True</td>
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<tr>
<td>2</td>
<td>37W</td>
<td>High 9/11 First Axle Weight Warning</td>
<td>item.NumberOfAxleWeights &gt; 0 &amp; item.VehicleClass = &quot;09&quot; &amp; item.VehicleClass = &quot;11&quot; &amp; item.AxleWeight &gt;= 13</td>
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<tr>
<td>2</td>
<td>37E</td>
<td>High 9/11 First Axle Weight Error</td>
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<tr>
<td>2</td>
<td>36W</td>
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<tr>
<td>2</td>
<td>36E</td>
<td>Low 9/11 First Axle Weight Error</td>
<td>item.NumberOfAxleWeights &gt; 0 &amp; item.VehicleClass = &quot;09&quot; &amp; item.VehicleClass = &quot;11&quot; &amp; item.AxleWeight1 &lt;= (decimal) 5</td>
<td>1</td>
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<td>No Class Code</td>
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<tr>
<td>2</td>
<td>20E</td>
<td>Speed Zero</td>
<td>IsNull(item.VehicleSpeed)</td>
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<td>item.VehicleSpeed = 0</td>
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<td>29W</td>
<td>Speed High Warning</td>
<td>IsNull(item.VehicleSpeed) &amp;&amp; item.VehicleSpeed &gt;= 90</td>
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<td>29E</td>
<td>Speed High Error</td>
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<td>Speed Low Warning</td>
<td>IsNull(item.VehicleSpeed) &amp;&amp; item.VehicleSpeed &lt;= (decimal) 9.9</td>
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<tr>
<td>2</td>
<td>28E</td>
<td>Speed Low Error</td>
<td>IsNull(item.VehicleSpeed) &amp;&amp; item.VehicleSpeed &lt;= (decimal) 9.9</td>
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</tbody>
</table>
Autopolling Process

**Job Manager**
- **Polling Job Runner**
  - Executes Polling Jobs
  - Records Results
  - Notifies Users
  - Sends data into TCDS for import
- **Device Drivers**
  - Implements Device Specific Logic
  - Utilizes Manufacturer Software

**Scheduling Service**
- Schedules Polling Jobs for Execution

**Web Interface**
- Configure Devices
- Schedule Polling
- Review Results
- Diagnose Connectivity Problems

**Secure VPN**
- Private DOT Network
- Internet
- Landline

Field Devices
Expanded Imports

- Permanent Counter Brands (6)
- WIM Counter Brands (6)
- Portable Counter Brands (10)
- ITS Systems (4)
- Signal Control Systems (9)
## Compatible Counters / Formats

- Actra
- Centracs
- Diamond
- DV03
- ECM
- FHWA TMG
- Golden River
- HiStar/Numetrics
- IRD
- JAMAR
- Kistler
- MarcNX
- Metrocount
- Mettler Toledo
- Miovision
- Peek
- Pico
- PRN
- Q-Free TDC/EMU
- RTMS
- SCATS
- Seimens i2
- Sensys
- Smartway
- TIRTL
- Timemark
- Wavetronix
Compatible Signals

- Actra
- Centracs
- GridSMART
- Iteris Vantage
- MarcNX
- NAZTEC
- SCATS
- SEIMENS i2
- TransCore TransSuite
Comprehensive Reporting

- Single Station
- Multi-Station
- Single Day
- Multi-Day
- Volume, Speed, Class Gap, WIM, MEPDG, HPMS
- Patterns: Seasonal, Hourly, Daily, Day of Week, Monthly
- Report Center
- Dynamic Graphs
- Ad Hoc Reports
- QC Reports
- Export to File

Modern Traffic Analytics
Report Center

Transportation Data Management System - Internet Explorer

Texas Department of Transportation
Transportation Data Management System

Report: None
Dates: None
Process: Immediately

Locations | Reports | Options | Output

County - Travis, ISPM Station - 1

17 Location(s) Found

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<tr>
<th>Loc ID</th>
<th>County</th>
<th>Community</th>
<th>On</th>
<th>From</th>
<th>To</th>
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<td>A346</td>
<td>Travis</td>
<td>Austin</td>
<td>US0183</td>
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<td>2-WAY</td>
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<td>A53</td>
<td>Travis</td>
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<td>SH0071</td>
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<td>S131</td>
<td>Travis</td>
<td>Austin</td>
<td>US 183</td>
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<td>Travis</td>
<td>Austin</td>
<td>IH0036</td>
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<td>SL0001</td>
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<td>SH130</td>
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</table>

Modern Traffic Analytics
Report Center

Texas Department of Transportation

Transportation Data Management System

Report: Volume > Traffic Volume Index and Growth Rate by Year (Chart)
Dates: 1/1/2011 - 12/31/2015
Process: Immediately

Choose Dates
- Time Span: Last 5 Years
- Start Date: 1/1/2011
- End Date: 12/31/2015
- Required Fields

Modern Traffic Analytics
Report Center

Modern Traffic Analytics
# Volume Balancing

Volume Balancing Computations

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<th>Name</th>
<th>Type</th>
<th>Fixed?</th>
<th>AADT</th>
<th>Weight</th>
<th>Error Offset</th>
<th>Adjusted</th>
<th>Final AADT</th>
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<td>11,995</td>
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<td></td>
<td>11,995</td>
<td>11,995</td>
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<tr>
<td>B</td>
<td>On Ramp</td>
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<td>923</td>
<td>.3341</td>
<td>+134</td>
<td>1,057</td>
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<tr>
<td>C</td>
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<td>.3812</td>
<td>-153</td>
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<td>899</td>
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<td>D</td>
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Online Backup

Microsoft Access Backup

If a Location search has been done, the results will serve as the basis for the backup, further refined by the criteria values below (if any). If the total count of the rows in all backup tables exceeds 10,000,000 rows, or if the criteria are too complicated, you will be asked to refine your search.

Microsoft Access Backup data dictionary

Search Criteria

Start Date | End Date | (Dates are inclusive)

- Include Child (Directional and Lanes) Locations
- Include Permanent Locations

Compute Size | Cancel
Backup API

- DOT INITIATES BACKUP
  - Cutoff Date
  - Maximum Record Count

- MS2 TDMS STARTS BACKUP

- DOT'S PROCESS AWAITS BACKUP COMPLETION
  - Periodically Polls Backup Status

- MS2 TDMSCompletes BACKUP PROCESS

- DOT DOWNLOADS BACKUP

- Simple
- Platform Agnostic
- Supports Delta-Based Workflow
HPMS (Traffic Network)
HPMS (Traffic Network)

- Road segmentation management
- Spatial editing of traffic segments
- Assignment of count station to road segments
- Estimating of HPMS traffic statistics for segments without actual traffic count data
- Network VMT Calculation
- FHWA HPMS traffic reporting
Agenda

1. MS2 Overview
2. TN-TIMES Project
3. TCDS/HPMS Features
4. Q&A
Questions & Answers

My Contact Info:

MS2
Ben Chen, PE, PTOE
Founder / Principal
bc@ms2soft.com
734-389-7000
5200 S State Road, Suite 100
Ann Arbor, MI 48108