

JOINT FLORIDA
Model Task Force & Transportation
Data and Analytics Workshop



Traffic Data Monitoring System (TDMS)

Steven Bentz, PE / Ben Chen, PE, PTOE





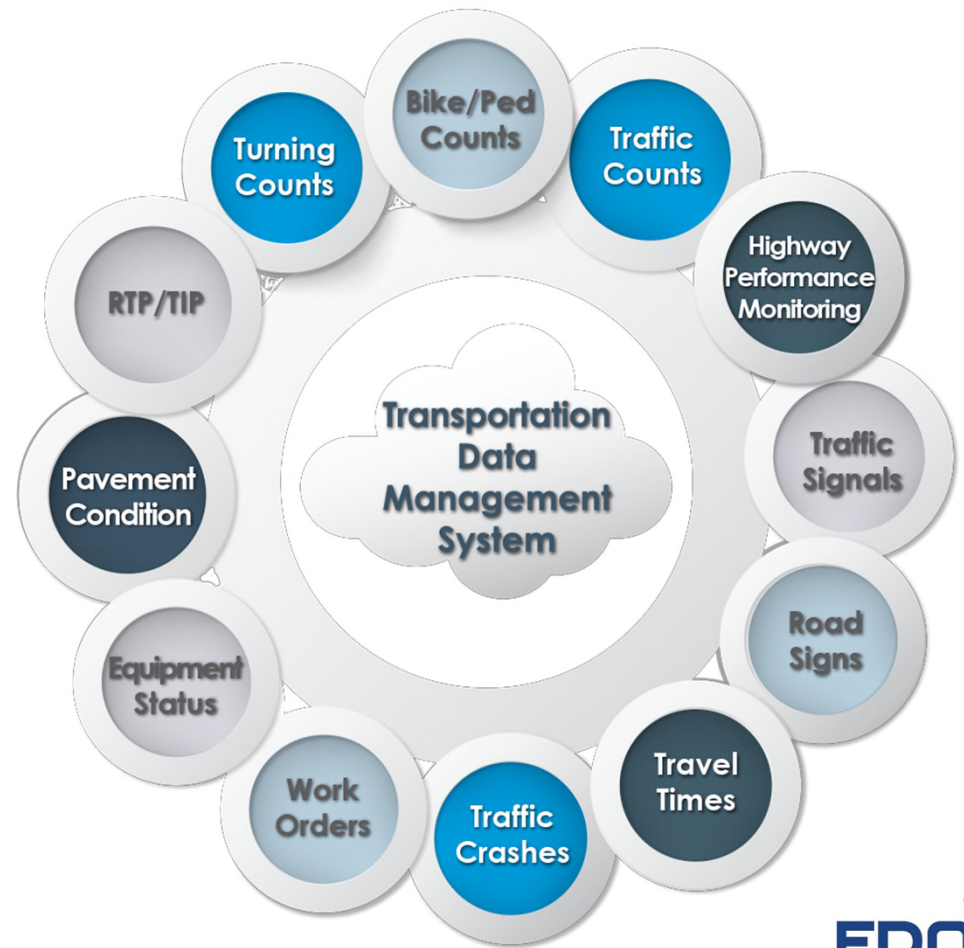
Agenda

1. MS2 Overview
2. FDOT TDMS
3. Question and Answer





Pioneer and National Leader of cloud-based TDMS used by more than 260 agencies in 30 states, including DOTs, MPOs, counties and cities





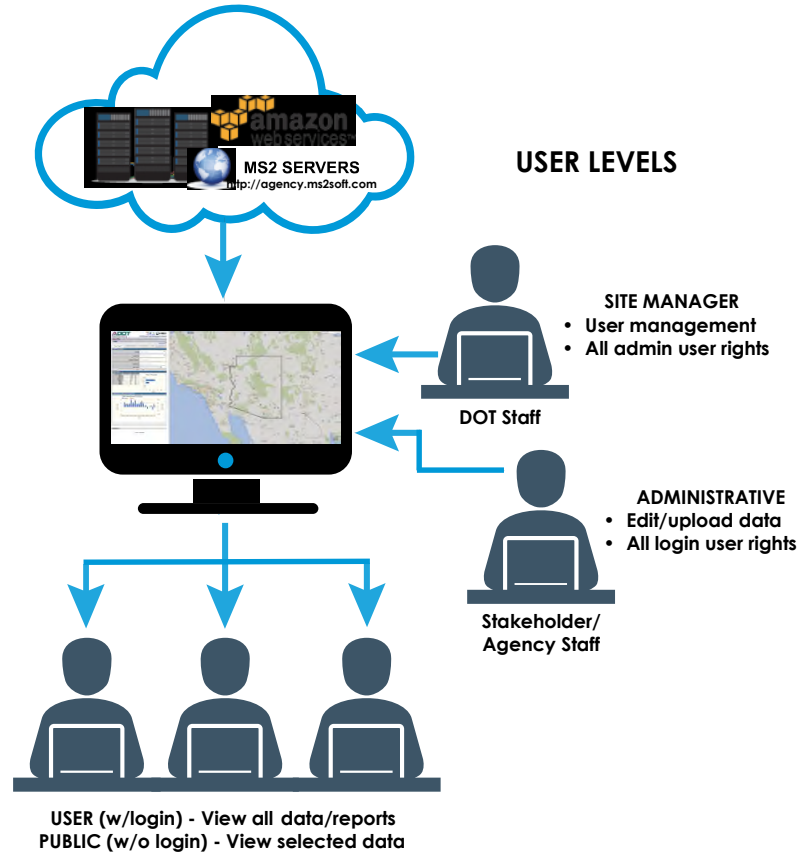
Modules and Extensions

Module \ Extension	Autopolling	Scheduler	Field Tool	ESRI R&H
TCDS (Traffic Count)	Option	Option	Option	Option
TMC (Turning Movement)	Option	Option	Option	Option
HPMS (Traffic Network Analysis)				Option
NMDS (Bike and Ped)	Option	Option	Option	Option
WOTS (Work Order)				
ESTS (Equipment Status)				



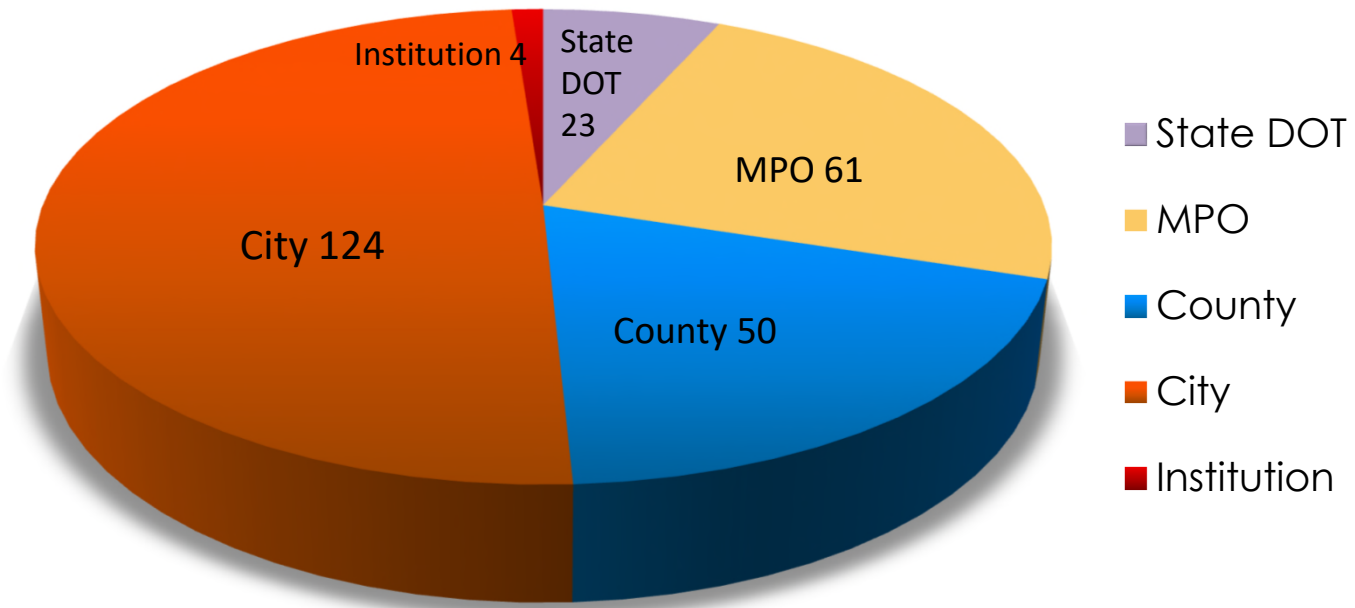


Multiple User Levels



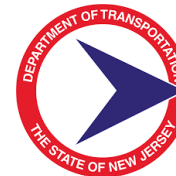


Over 260+ Users





23 State DOT Clients

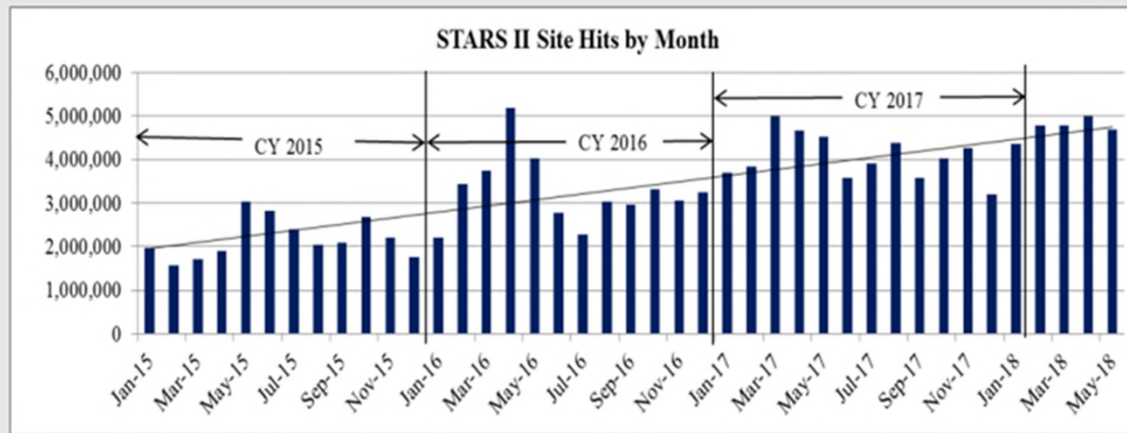




Award-Winning Solution

Statewide Traffic Analysis and Reporting System (STARS II)

- Awarded WASHTO Gold Level 2017 Journey Toward Excellence (JTE) Quality Award for Texas DOT
- Implementation: January 2014
- Since January 2015: Almost 138 million total hits





Agenda

1. MS2 Overview
2. **FDOT TDMS**
3. Question and Answer





FDOT Modules/Extensions

Modules and Extensions	License Type	Included
TCDS (Traffic Count)	Enterprise (unlimited agency users)	Yes
- Data Backup API		Yes
- Autopolling		Yes
- Scheduler		No
- Field Tool		No
- ESRI R&H		No
TMC (Turning Movement)		No
HPMS (Network Analysis)	Enterprise (unlimited agency users)	Yes
NMDS (Bike and Ped)	Enterprise (unlimited agency users)	Yes
WOTS (Work Order)		No
ESTS (Equipment Status)		No





TCDS (Traffic Count)

Transportation Data Manager

fdot.ms2soft.com/tcds/tsearch.asp?loc=fdot

FDOT MS2 Transportation Data Management System

Home HPMS LSMS TCLS TTDS PMS PMOS RSMS NMDS PMMS RTLY

Backup Admin Login Logout + Locate + Locate All

Welcome: bc Auto-Locate OFF

Quick Search Advanced Search Map Search Tools

TCDS Quick Search

County: Select County

Community: Select Community

Located On (Road): Select On Road

Location ID: Select Location ID

Count Year: [Dropdown]

Search Clear

Station Data

Station Type	Continuous	Short	WIM
Total	371	16,462	35
AADT	309	16,344	30
Volume	341	16,329	35
Class	285	0	35
Speed	285	0	35
Gap	0	0	0
WIM	45	0	34

Percent of Data by Type

Traffic Volume Index and Growth Rate

Map

Enter Address [] Locate

TCDS

- Clear Located
- Select by Polygon
- Select Using Buffer
- Select AADT & Growth Report
- TCDS Locations
- Continuous [] AADT []
- ALL []

Tools

- General
- Google
- TCDS

Map data ©2020 Google, INEGI 50 km Terms of Use





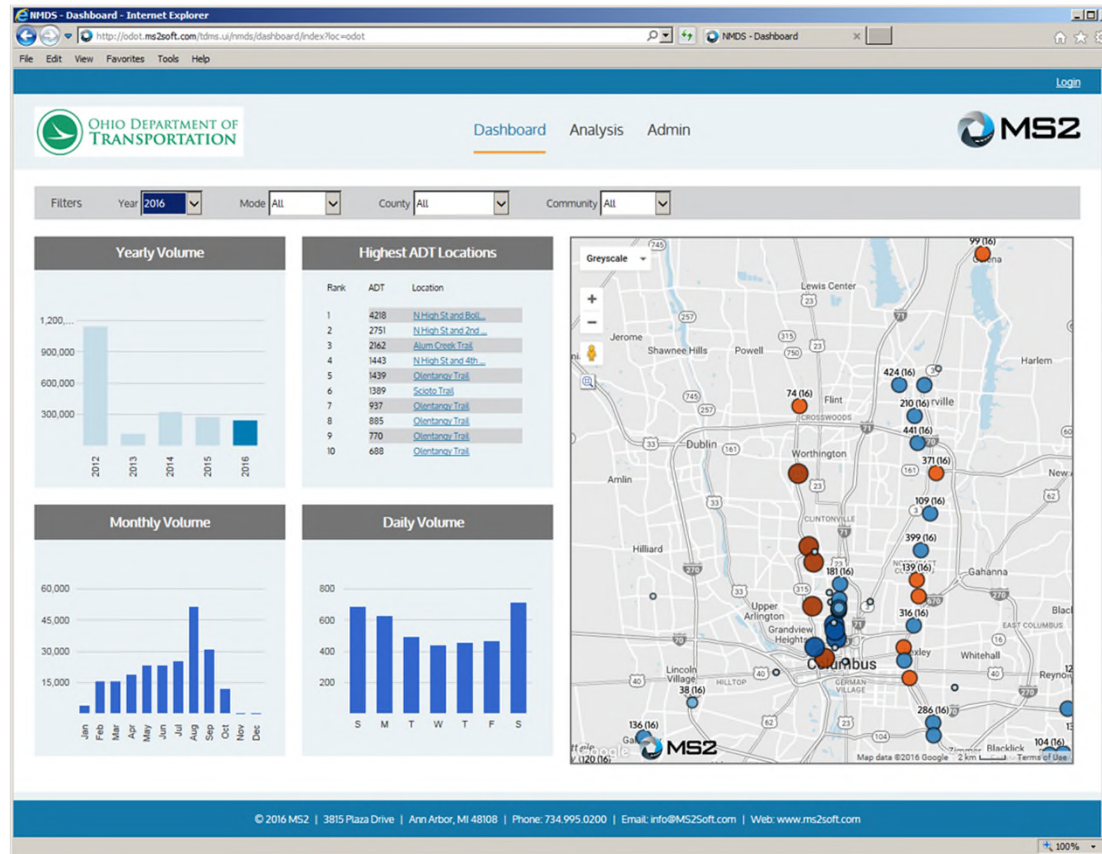
TCDS (Traffic Count)

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





NMDS (Bike & Ped)





NMDS (Bike & Ped)

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





HPMS Module

Transportation Data Management System - Internet Explorer

http://odot.ms2soft.com/tms/

File Edit View Favorites Tools Help

OHIO DEPARTMENT OF TRANSPORTATION
Highway Performance (HPMS)

Welcome: Ben Chen

Tasks

Segment Information

RIA Route ID	SFRAUS00040**C
Flagged for Review	False
TCDS Location ID	5925
HPMS Year	2013
Design Year	2043
District	6
County	Franklin
Functional Class	4
Control	
Section	
Begin Milepoint	3.620000
End Milepoint	4.740000
Length in Miles	1.120000
Hwy. System	
Hwy. Number	
Hwy. Suffix	
Highway	
Population Code	U
Direction of Travel	

Edit Segment Return to List Locate

AADT Information

AADT	Year	2013
AADT	13,653	2013
Daily VMT	15,291	# of Trks 421
Design Hour Volume	0	
K-Factor	0.0	Dir Dist 0.00
Flex (K)	0	Rigid (K) 0
%Trks in AADT	3.0	%Trks in DHV 0.0
ATHW LD (Sin)	0	ATHW LD (Tan) 0
%Single Unit AADT	0.0	%Combo Unit AADT 0.0
%Single Unit DHV	0.0	%Combo Unit DHV 0.0
Design Year AADT	13,650	Design Year 2043
Design Year Daily VMT	15,288	%Annual Growth Factor 0.0

Map

Enter Address Locate

HPMS

- Clear Located
- TCDS Locations
- HPMS Segments
- ALL
- Traffic Flow 2013

Tools

- General
- Google
- HPMS

BMP: 3.620
EMP: 4.740
Milepoint: 3.828
Location ID: 5925
AADT: 13653

Select Segment Search

View Detail

Map data ©2015 Google 200 m






HPMS (Traffic Network)

- Road network segmentation management
- Spatial editing of traffic segments
- Assignment of count station to segments
- Estimating of HPMS traffic statistics for segments
- QA/QC of network traffic statistics
- Visualization of network traffic statistics
- Network VMT Calculation
- Tracking of network traffic statistics history
- Annual FHWA HPMS traffic reporting





ERD (Event Response Dashboard)


Event Response Dashboard

Counter 0132

Road: I-95 County: Nassau Near: Georgia Line Update Frequency: ■ Real-time Speed Limit: 70 mph

Show me data for:

NB/SB Graph
NB Graph
SB Graph
Data
View TCDS Location Data

Time (EST)	Northbound			Southbound		
	Speed	Volume	Historic Volume	Speed	Volume	Historic Volume
4:15pm - 4:00pm	70	507	468	68	454	442
4:00pm - 3:45pm	69	507	502	69	454	444
3:45pm - 3:30pm	69	372	390	68	347	332
3:30pm - 3:15pm	71	377	368	68	377	356
3:15pm - 3:00pm	70	372	369	71	347	352
3:00pm - 2:45pm	68	377	368	69	377	302
2:45pm - 2:30pm	68	372	362	70	347	352
2:30pm - 2:15pm	68	377	362	71	377	367

[Close](#)





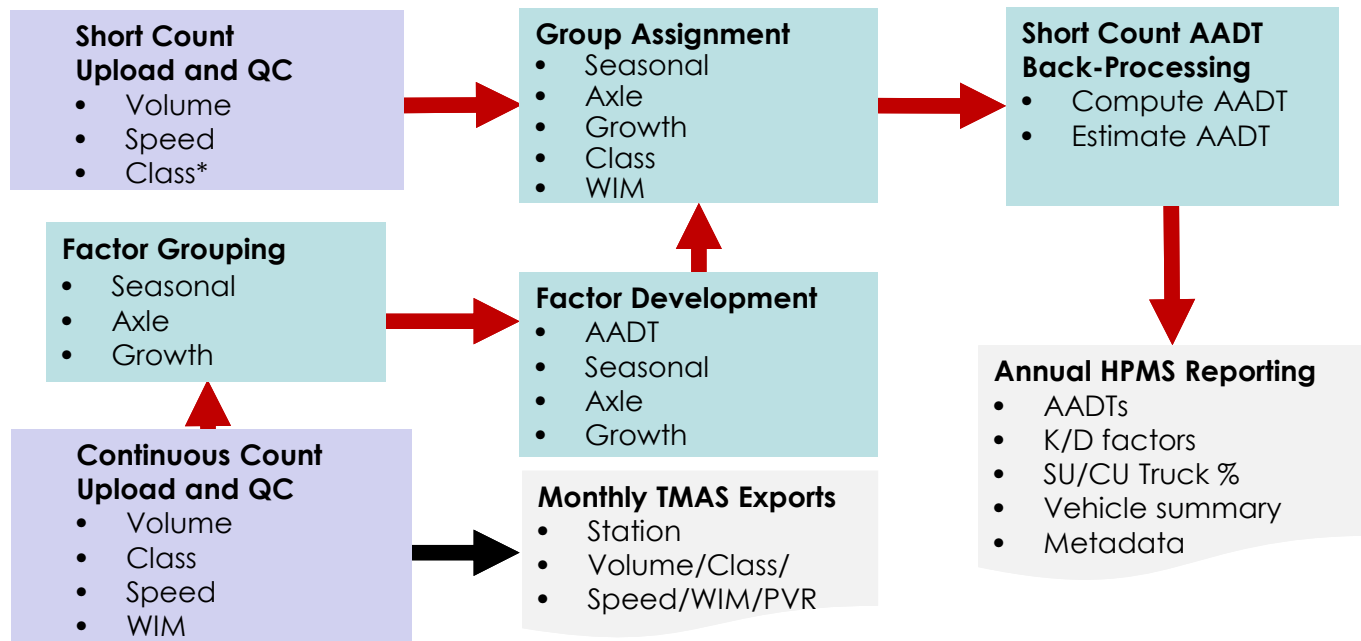
ERD (Event Response Dashboard)

- Provide real time traffic conditions for special events
- Connect to continuous count stations with real time feature
- Include current traffic volume/speed and historic patterns
- Display live video feeds
- Support evacuation route monitoring





Traffic Data Processing



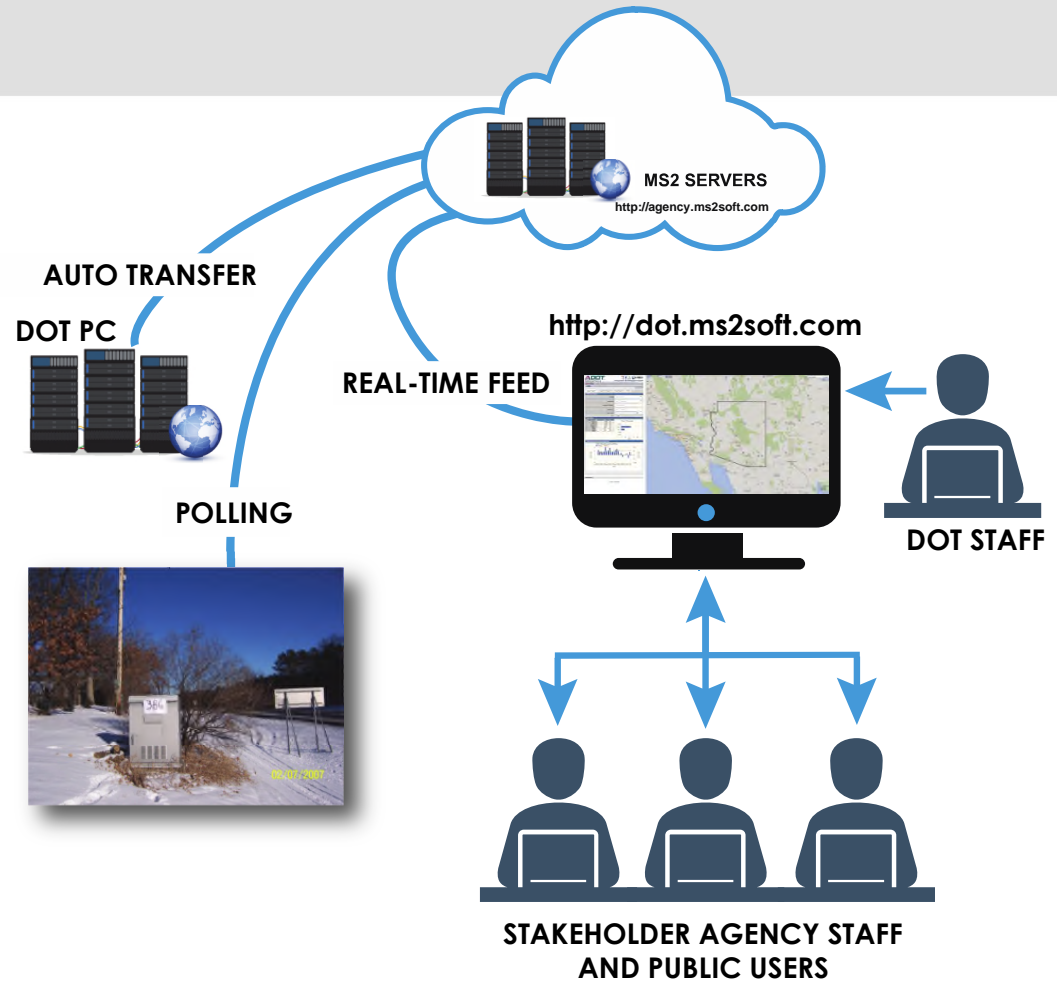
* Class counts are used in axle factor grouping and development





Device Polling

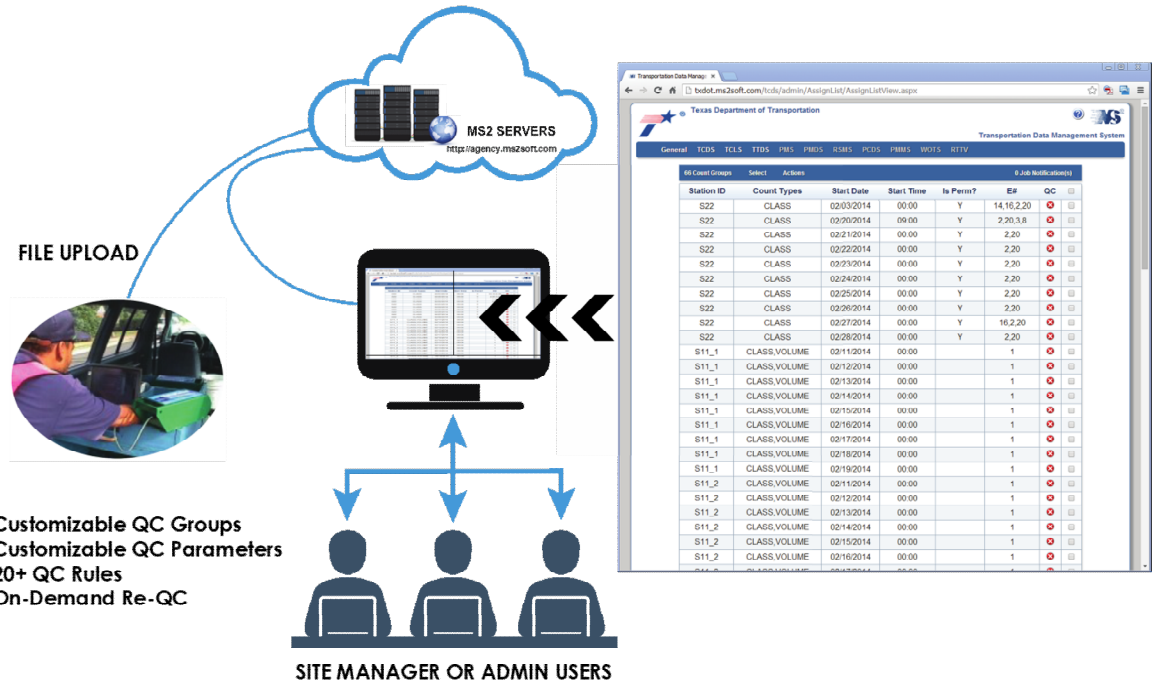
- Auto Assign
- Auto QC
- Failure Recovery





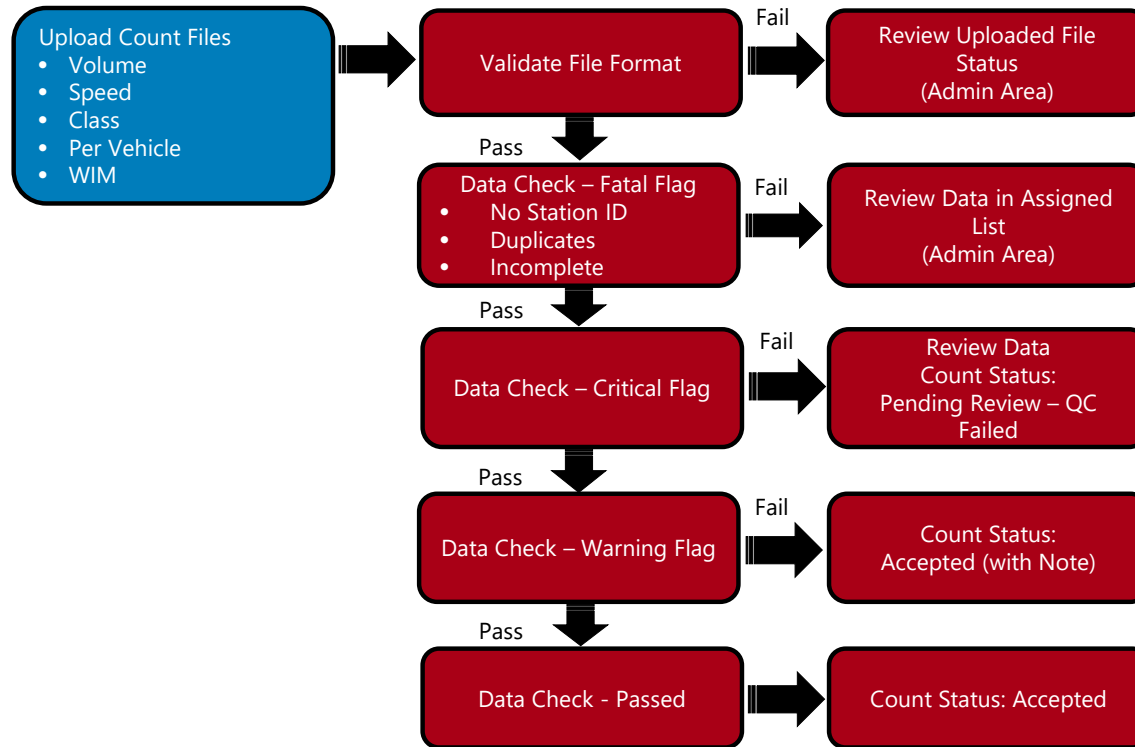
Automated QC

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





QC Process





Ad-Hoc QC Rule Engine

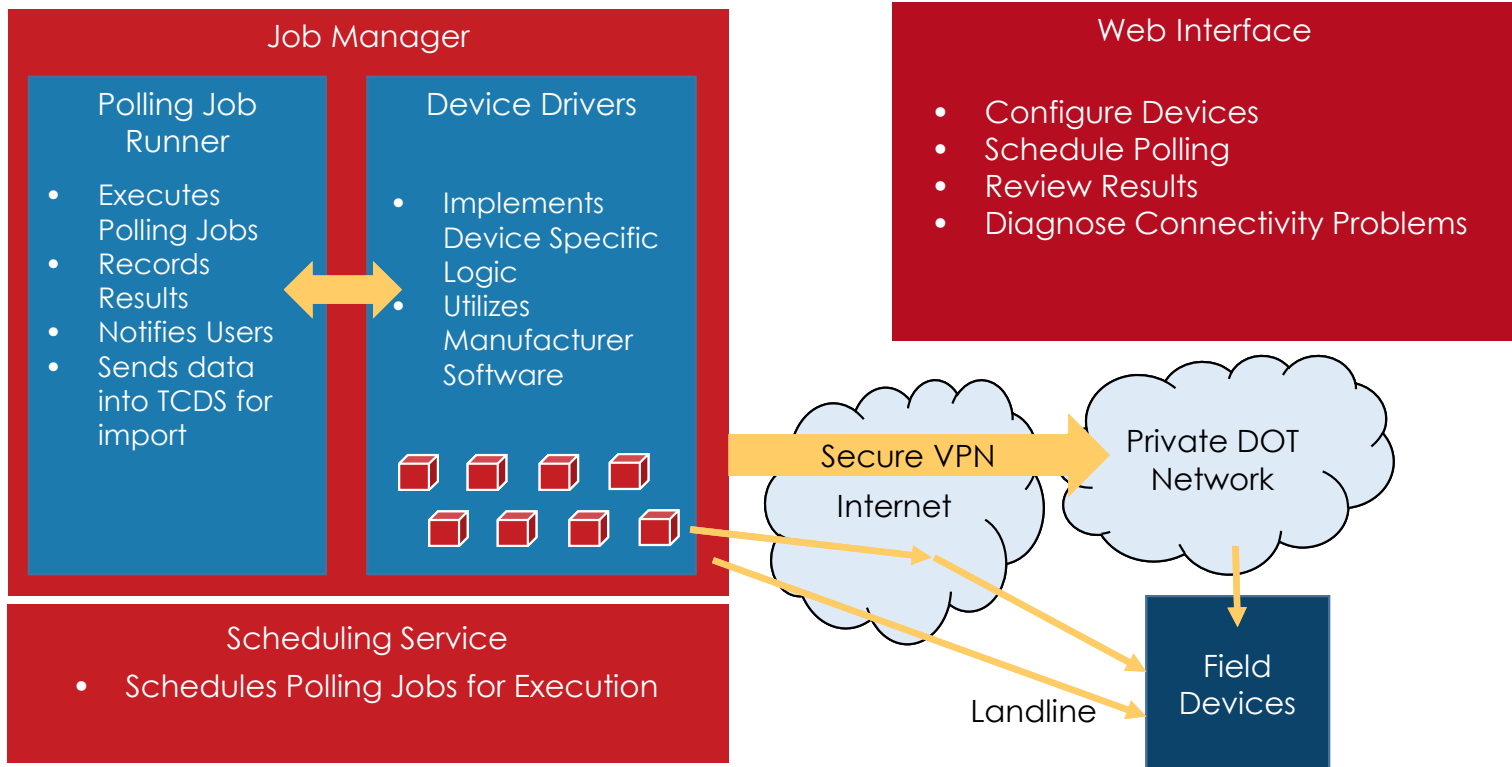
- If a "RuleAction" is 1, a vehicle violating the rule will be marked as Invalid.
- The "RuleCode" field uses error codes with an E appended for Error, W for Warning.

RuleSetId	RuleCode	RuleName	RuleExpression	RuleAction	IsActive
2	31W	Axle Count High Warning	item.NumberOfAxles >= 14	0	True
2	31E	Axle Count High Error	item.NumberOfAxles >= 20	1	True
2	30E	Axle Count Low	item.NumberOfAxles <= 1	1	True
2	33W	Axle Spacing High Warning	item.AxleSpacingMax >= 50	0	True
2	33E	Axle Spacing High Error	item.AxleSpacingMax >= 99	1	True
2	32W	Axle Spacing Low Warning	item.AxleSpacingMin <= 3	0	True
2	32E	Axle Spacing Low Error	item.AxleSpacingMin <= 2	1	True
2	26E	Axle Weight <> GVW	item.TotalWeightOfVehicle >0 && (Math.Abs(item.TotalWeightOfVehicle-item.SumOfAxleWeight) / item.TotalWeightOfVehicle) >= (decimal).1	1	True
2	42E	Axle Weight High	item.AxleWeightMax >= 50	1	True
2	41E	Axle Weight Low	item.AxleWeightMin <= (decimal).5	1	True
2	24E	Axes vs Spaces	item.NumberOfAxleWeights != (item.NumberOfAxleSpacings +1)	1	True
2	27E	Axes vs Total Axes	item.NumberOfAxleWeights != item.NumberOfAxes	1	True
2	37W	High 9/11 First Axle Weight Warning	item.NumberOfAxleWeights > 0 && (item.VehicleClass == "09" item.VehicleClass == "11") && item.AxleWeight1 >= 15	0	True
2	37E	High 9/11 First Axle Weight Error	item.NumberOfAxleWeights > 0 && (item.VehicleClass == "09" item.VehicleClass == "11") && item.AxleWeight1 >= 40	1	True
2	36W	Low 9/11 First Axle Weight Warning	item.NumberOfAxleWeights > 0 && (item.VehicleClass == "09" item.VehicleClass == "11") && item.AxleWeight1 <= 7	0	True
2	36E	Low 9/11 First Axle Weight Error	item.NumberOfAxleWeights > 0 && (item.VehicleClass == "09" item.VehicleClass == "11") && item.AxleWeight1 <= (decimal).5	1	True
2	21E	No Class Code	item.VehicleClass == "00" item.VehicleClass == ""	1	True
2	20E	Speed Zero	IsNull(item.VehicleSpeed) item.VehicleSpeed == 0	1	True
2	29W	Speed High Warning	!IsNull(item.VehicleSpeed) && item.VehicleSpeed >= 90	0	True
2	29E	Speed High Error	!IsNull(item.VehicleSpeed) && item.VehicleSpeed >= 155	1	True
2	28W	Speed Low Warning	!IsNull(item.VehicleSpeed) && item.VehicleSpeed <= (decimal)39.9	0	True
2	28E	Speed Low Error	!IsNull(item.VehicleSpeed) && item.VehicleSpeed <= (decimal)9.9	1	True





Autopolling Process





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
- Centrac
- Diamond
- DV03
- ECM
- Eco Counter
- 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
- TraffX
- Wavetronix





Compatible Signals

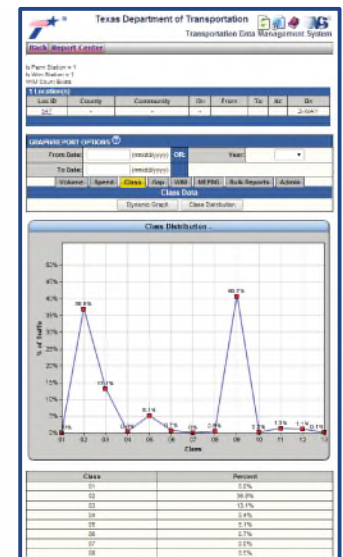
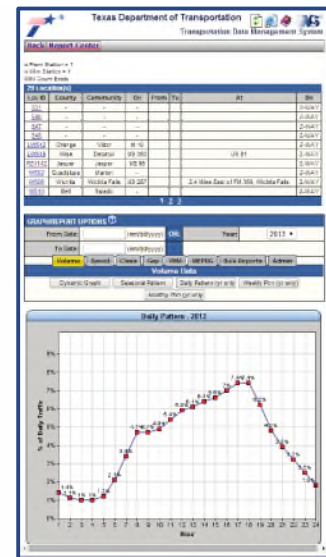
- Actra
- Centrac
- GridSMART
- Iteris Vantage
- MarcNX
- NAZTEC
- SCATS
- SEIMENS i2
- TransCore TransSuite





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



USERS





Report Center

Transportation Data Management System - Internet Explorer

http://txdot.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=TCDS

File Edit View Favorites Tools Help

Texas Department of Transportation

MS2
Transportation Data Management System

Report : None
 Dates : None

Process : Immediately Submit Job (long running reports)

Home Go Back

Locations Reports Options Output Previous Next

County = Travis, Is Perm Station = 1

17 Location(s) Found						17 Location(s) Selected		
Loc ID	County	Community	On	From	To	At	Dir	✓
A348	Travis	Austin	US0183				2-WAY	✓
A53	Travis	-	SH0071				2-WAY	✓
S131	Travis	Austin	US 183			3.3 miles south of SH0071	2-WAY	✓
S132	Travis	Austin	IH0035			North of Town Lake Bridge	2-WAY	✓
S190	Travis	Round Rock	IH0035			1.9 miles south of FM1825	2-WAY	✓
S209	Travis	Austin	SL0001				2-WAY	✓
S216	Travis	Austin	US0290			4.2 miles west of FM1826	2-WAY	✓
S241	Travis	Austin	SL0001			0.9 mile North of Braker Lane	2-WAY	✓
S253	Travis		SH0130			SH 130, 0.5 Mile North of FM 812	2-WAY	✓
S284	Travis	Austin	SH0045			SH 45, 2.3 Miles East of IH 35	2-WAY	✓
S347	Travis	Austin	US0183				2-WAY	✓
S348	Travis	Austin	US0183			US 183, Just North of Mopac	2-WAY	✓





Report Center



Transportation Data Management System

Report : None

Dates : None

Process : Immediately Submit Job (long running reports)

[Home](#) [Go](#) [Back](#)

Locations	Reports	Options	Output	Previous	Next
Station	>				
Volume	>	Detail Reports			
Class	>	AADT and AADT Trucks by Year (Chart)			
Length	>	AADT by Year by Direction (Chart)			
Speed	>	AADT by Year Comparison (Chart)			
WIM	>	AADT by Year Comparison Matrix (Chart)			
HPMS	>	AADT/AAWD/AAWET Year Over Year Comparison			
MEPDG	>	ADT by Day of Week by Month for Year			
Export	>	Avg Hourly Traffic by Day of Week for Year			
Admin	>	High Hourly Volumes for Year			
Custom	>	K/D Factor For High Hour By Year			
Top 10 This User	>	MADT by Direction for Year			
Top 10 All Users	>	Monthly Traffic Calendar			
		Representative Counts by Quarter			
		Volume by Hour by Day for Month			
		Volume By Hour By Week			







Report Center

Transportation Data Management System - Internet Explorer

http://txdot.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=TCDS

File Edit View Favorites Tools Help

 **Texas Department of Transportation**

 **MS2**

TCDS Help Refresh Support

Transportation Data Management System

Report : Volume > Traffic Volume Index and Growth Rate by Year (Chart)

Dates : 1/1/2011 - 12/31/2015

Process : Immediately Submit Job (long running reports)

[Home](#) [Go](#) [Back](#)

Locations Reports Options Output

Choose Dates

Time Span : Last 5 Years

* Start Date : 1/1/2011

* End Date : 12/31/2015

* Required Fields





Report Center

Transportation Data Management System - Internet Explorer
 http://txdot.ms2soft.com/tcds/search.asp?loc=Txdot&mod=TCDS

File Edit View Favorites Tools Help

Texas Department of Transportation **MS2**
 Transportation Data Management System

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

Home Go Back

Locations Reports Options Output

1 of 1 Find | Next

CSV (comma delimited)
 PDF
 Excel
 TIFF file

and Programming Division's and Reporting System II

Traffic Volume Index and Growth Rate by Year for 1/1/2011 - 12/31/2015
 Criteria: County = Travis, Is Perm Station = 1

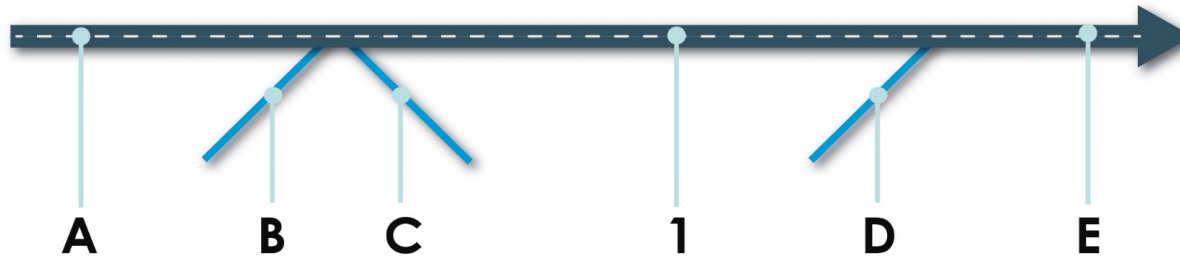
Traffic Volume Index and Growth Rate

Year	Volume Index	Growth Rate
2012	1.00	
2013	1.01	0.9%
2014	1.04	3.6%
2015	1.07	1.9%





Volume Balancing



Volume Balancing Computations

Name	Type	Fixed?	AADT	Weight	Error Offset	Adjusted	Final AADT
A	Start Node	Yes	11,995			11,995	11,995
B	On Ramp		923	.3341	+134	1,057	1,057
C	Off Ramp		1,053	.3812	-153	900	899
1	Virtual Station						12,153
D	On Ramp		786	.2845	+114	900	900
E	End Node	Yes	13,053			13,053	13,053
	Error		-402			-1	0





Online Backup

TCDS Backup - Internet Explorer
http://txdot.ms2soft.com/tcds/tcds_backup.aspx?childWindow=1

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

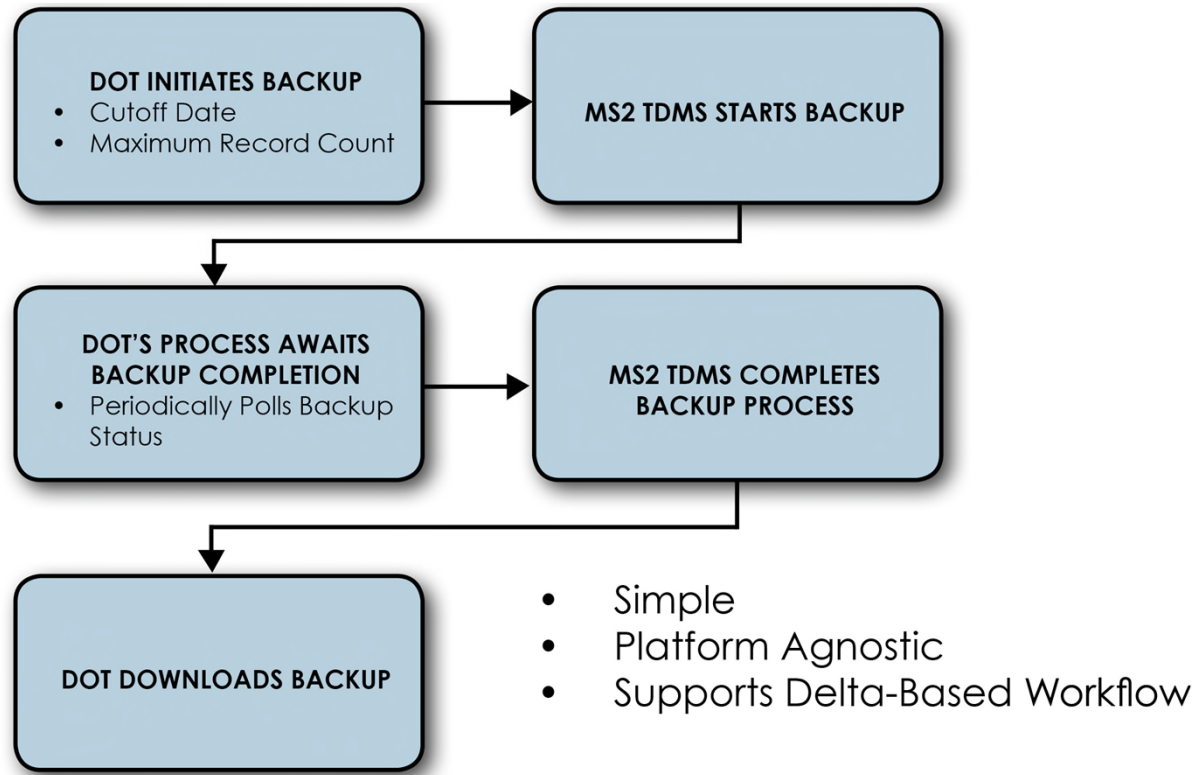
Include Permanent Locations

100%



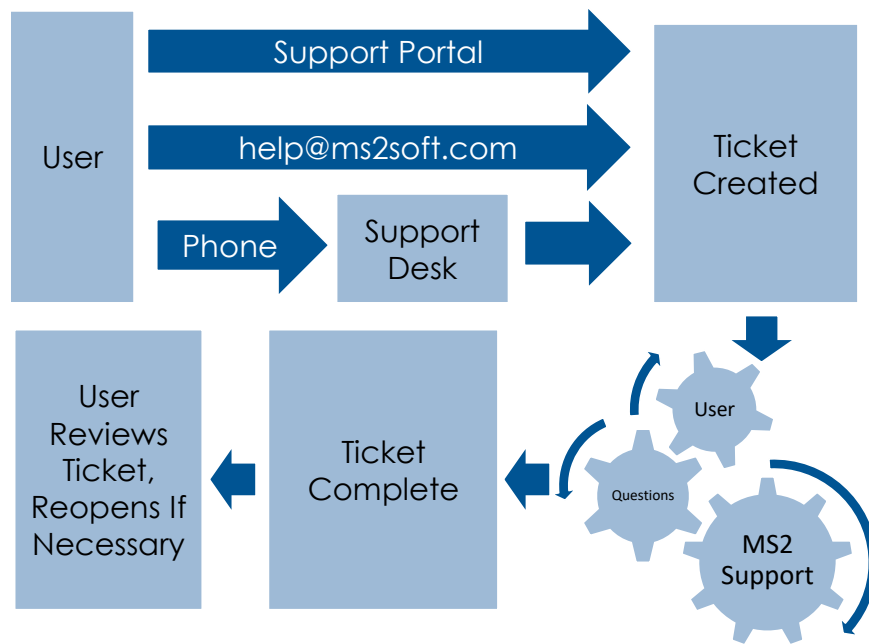


Backup API





Support Process



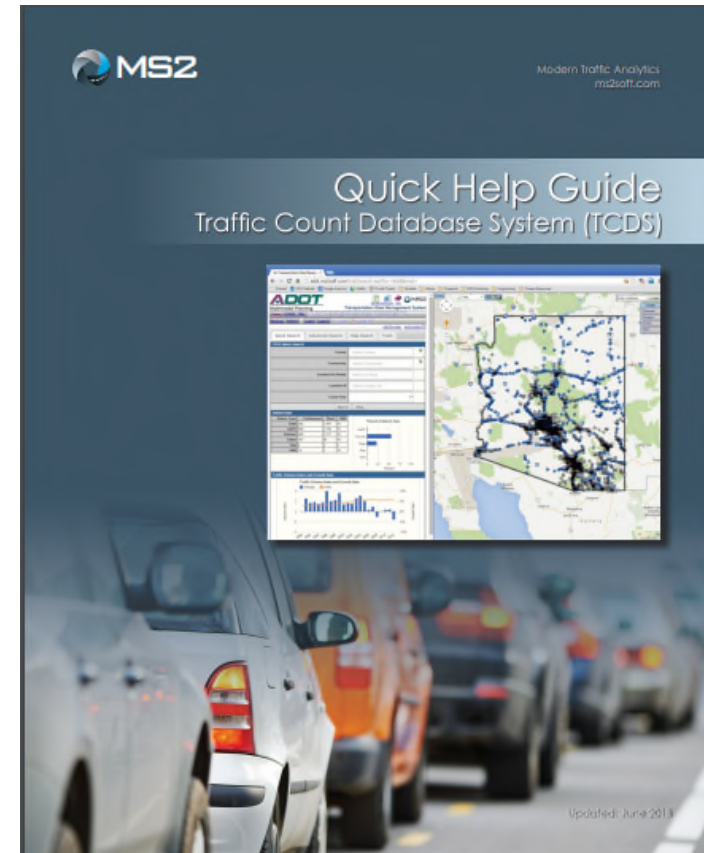
- Notifies users about activity via email
- Allows users to see support activity from other users in their organization
- Allows MS2 to track support metrics
- Integrated with TCDS Knowledgebase





User Help

- Context-sensitive online help
- User Guides
- Unlimited WebEx trainings
- On-site workshop as needed
- FAQ Forum
- Bi-Annual NATMEC User Meetings
- Bi-Annual User Conference





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