# TRAFFIC STUDIES MADE SIMPLER: COUNT AND CLASSIFICATION IN THE CLOUD

ALL TRAFFIC SOLUTIONS™

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**All Traffic Solutions** 12950 Worldgate Drive, Suite 310, Herndon, VA 20170
**P** 866.366.6602 **E** sales@alltrafficsolutions.com

# Overview

At the heart of every great traffic engineering project is a good traffic study. Data derived from traffic studies provides the information needed to make the right decisions about safety, efficiency and effectiveness of traffic management efforts.

But undertaking a traffic study? What about time commitment? Cost? Duration? Resources and safety? These can be hard to quantify. The typical answer is "Well, that depends..." on what you're studying and the kind of analysis you need.

The good news is that new traffic management technologies and enhancements are being developed all the time. Technology-based traffic equipment is more affordable, easier to deploy and manage, more compact, and there are more choices available.

Today, transportation data collection equipment or *counters* have become a component of the "Internet of Things" — that buzz phrase heard at conferences and on the news that more often than not refers to smart toasters and connected refrigerators. But in the case of web-enabled traffic devices, the benefits to the transportation industry are more substantial and yes, more justifiable than being able to see how your food is doing. Now, with a click of mouse you can check on the counter and the data it's collecting. You can make quicker judgements or decisions based on preliminary data and improve traffic flow with educated hypotheses about what's happening in the field.

Additionally, thanks to these cloud-enabled devices, you can test your hypotheses by running reports while they are still in the field collecting data. You can even begin to understand the bigger traffic picture by layering data from other devices or running competitive reports to compare how traffic is currently functioning throughout your city.

The devices have also become less intrusive. Now, *counters are small* enough that they can be banded on a road sign pole by a single person — saving manpower and time, and making those inconvenient road tubes a thing of the past.

### How much does it cost to prepare a traffic study?

Transportation studies can be expensive and should not be conducted without considering the alternatives. There is no "typical" cost for conducting studies since transportation problems often are unique in scope and sensitive to regional differences in travel patterns.

A traffic study can range in cost from a few thousand dollars to hundreds of thousands of dollars, based on the complexity and extent of the study.

**VISIT ONLINE**

*Institute of Transportation Engineers Traffic Study Fact Sheet*

**CASE STUDY**

## Missouri Department of Transportation (MoDOT)

U.S. Route 160 in Taney County, Missouri is one of those idyllic, hilly American country roads that motorcyclists love due to its twists and winds.

It's also one of the most dangerous for road workers.

"It's one of those roads you can't be out in the middle of during the daytime. It's so curvy, drivers don't see you working," said Mike Bock, Senior Traffic Studies Engineer at the Missouri Department of Transportation (MoDOT). "There's also nowhere to park a vehicle—no shoulder or driveways." This is hardly an ideal scenario for installing traffic equipment.

Until recently, each time the Southwest District was tasked with conducting a traffic study on U.S. 160, it took a team of workers to place counting equipment on the road. Several workers had to stop traffic while others worked to nail vehicle counters to the road or lay tubes across the lanes. Then they had to orchestrate the entire process again each time equipment was moved and when the department collected more data.

"Standing out in the middle of the road to stop traffic is unsafe," Bock said. "It takes just one driver not paying attention for something terrible to happen."

Gone are the days of heading out into the field to set up each device and then going back again periodically to collect the data. Oftentimes these trips included the unpleasant discovery that the device wasn't functioning properly or had been tampered with. This never-ending cycle ate up resources and sometimes resulted in incomplete or unusable data.

# Traffic Studies Made Simpler: Count and Classification in the Cloud

Thankfully no one in MoDOT's Southwest District had been hurt while installing traffic study equipment in the field, but the threat was real enough for the department to seek out safer alternatives.

"Safety is a major priority with us, and we were trying to find a solution to get us out of the road," said LeAnn Blankenship, MoDOT Senior Traffic Technician.

Recently, the District bought several StatTrak traffic data collection devices—traffic counters that quickly and easily attach to poles on the side of the road, rather than on the road itself—from All Traffic Solutions.

With these new counter classifiers, Bock can drop Blankenship off at the side of the road to install the device, and by the time he turns around to pick her up minutes later, she is ready to jump back in the truck.

StatTrak automatically uploads data to a secure cloud-based server called TraffiCloud™, also made by All Traffic Solutions. From there, report-ready data can be downloaded from any Internet-ready device and distributed to the right people for review and analysis. The company also makes an Android app to help customers monitor devices.

"One of the advantages is that I can ensure that my unit is working properly [without driving to the device]," Blankenship said..

Using StatTrak, MoDOT collects the timely, accurate data it requires to complete its traffic studies without endangering workers or taking hours out of the field.

# Welcome to TraffiCloud

For these reasons, All Traffic Solutions developed TraffiCloud, a web-based management solution providing turnkey, remote connectivity so all equipment can also be controlled where users are located, not only from the field.

Virtually everything that previously required actually going to a traffic sign can now be done in a fraction of the time from anywhere, anytime without any IT setup. This includes remote data collection and management, alerts for high speed or tampering, images, and remote troubleshooting of the equipment.

The TraffiCloud web-based management service is valuable to organizations looking to do more with less. Agencies challenged by complicated technology or wanting to consolidate the way they manage their tools and information will appreciate TraffiCloud capabilities, including the abilities to:

1. Manage equipment settings remotely from any Internet-connected device
2. Visualize and map an entire traffic management program on an interactive map
3. Automatically view data on the desktop and eliminate data file management
4. Generate and share detailed reports easily anywhere, anytime
5. Create, deploy and share messages based on live data
6. Benefit from a perpetual warranty on all equipment subscribed to TraffiCloud
7. Optimize enforcement speed captures and increase citation accuracy
8. Provide new analysis and metrics for end-to-end traffic management
9. Receive email or text alerts for low batteries, high speeds, tampering, congestion and more
10. View images related to alert thresholds, or generate awareness images based on a preset frequency

# Data Sharing and Analysis

"Thanks to TraffiCloud, data collection and analysis have become even easier," according to Ted Graef, All Traffic Solutions founder and Chief Operating Officer.

"Traffic engineers are accustomed to spending days tracking down data buried in Excel documents saved on someone's computer," he said. "With TraffiCloud, all anyone has to do is go online and all their information—from maps to traffic data—is right there in one central location. For example, StatTrak data is uploaded automatically directly from the unit, so when a user clicks on a specific location they have immediate access to the data and can easily run reports."

Data is also easily shared across departments or with partner agencies such as law enforcement. "Additionally," Graef said, "All Traffic Solutions has integrated mobile phone alerts so that traffic engineers are notified if one of their devices is broken, stolen or is low on batteries, and other new features are added periodically."

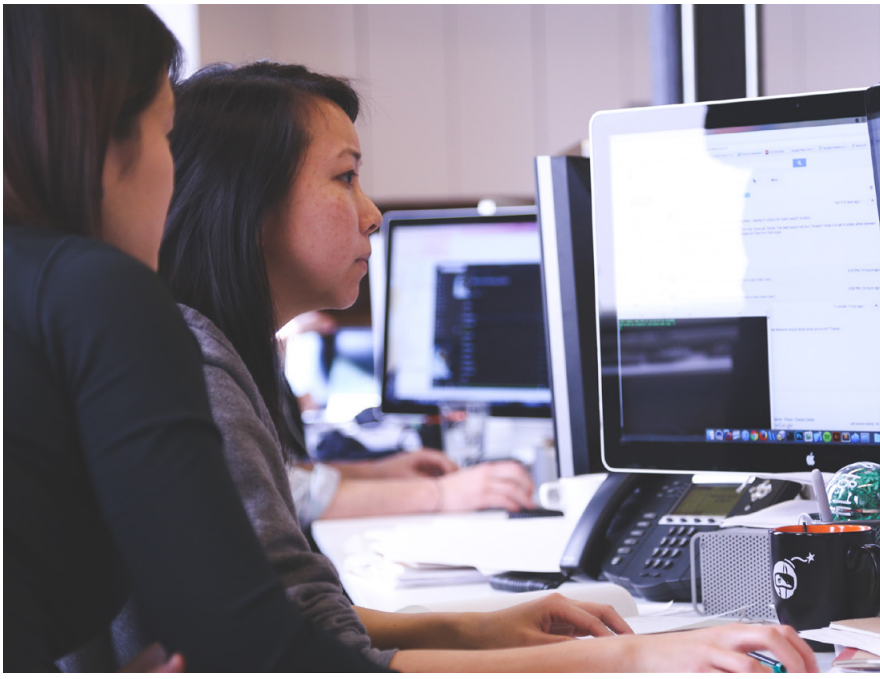
"In the near future, checking and analyzing traffic data will be as easy as checking your email," he added.

TraffiCloud has the added benefit of helping to make a city's traffic smarter by providing a system to coordinate all of its signs, sensors and devices, allowing traffic engineers to host all the data in one place, access it anywhere and make decisions based on the real-time data.

> “In the near future, checking and analyzing traffic data will be as easy as checking your email.”

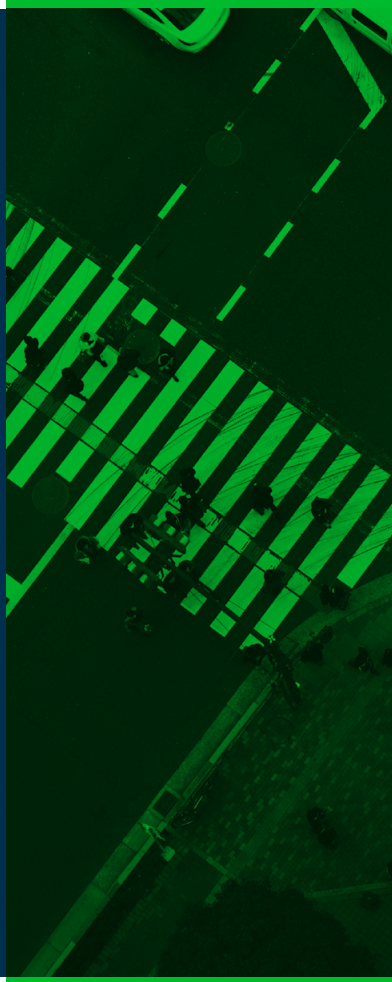
Additionally, attaching Excel documents and tracking changes can be a thing of the past. With TraffiCloud, the entire DOT can all be on the same page. Every logbook can be web enabled so anyone can access the most current version and base strategy on the most recent traffic reports. All the devices, regardless of manufacturer, can be integrated, providing a “traffic ecosystem” of speed sensors that work with counters and message signs so that drivers are aware of current roadway conditions.

A department could build this system itself with a team of IT professionals, but it would take valuable resources away from the department’s main mission. Hosted or “cloud-based’ systems allow busy traffic departments to focus on the end product, not on the technology to make it happen.



# Conclusion

**Using web-based counting and classifying devices that mount onto poles or medians, instead of busy roads, provides safety for installers and fast access to data from any Internet-ready device. You can utilize accurate, plentiful data for more informed decision-making and smoother, more expedient traffic studies.**



**Ask us for a personal demo of TraffiCloud™, the traffic management solution that lets you control your traffic devices and data from any Internet-ready device 24/7, providing a new level of awareness while reducing the amount of time needed to manage your traffic devices and information.**

**Call 866.366.6602 or email us at sales@alltrafficsolutions.com**

TraffiCloud leverages our patented technology (US Patents 8,417,442; 8,755,990; 9,070,287; 9,411,893) to deliver unique cloud-based management, features and functionality.

All Traffic Solutions delivers cloud-based traffic management solutions, including radar speed and variable message displays, imaging products and intelligent transportation systems for law enforcement, transportation and communities.

Our innovative TraffiCloud™ traffic management platform is changing the way communities solve their most complex traffic, transportation and parking challenges by allowing them to manage all their traffic equipment remotely, as well as leverage data to increase traffic safety, streamline their operations and achieve lasting results.

ALL TRAFFIC SOLUTIONS™

## ALL YOUR TRAFFIC SAFETY PROGRAM DATA IN ONE PLACE

TraffiCloud is an ATS secure, web-based ecosystem for managing all your traffic safety data and components. View dashboards and reports of all collected data in real time.

Make more insightful decisions based on data analytics from all your program components. Save time by managing the status of connected devices and dynamic messaging all from one central location. Reports display data by sites, time, date and speed.

## SPEED SUMMARY REPORT

Traffic volume and speeds at a site. Speeds by the hour and totals for the time range selected.

### ALL TRAFFIC SOLUTIONS: SPEED SUMMARY REPORT

Generated by Ted Graef from All Traffic Solutions Software Developer Account on 10/22/2014 at 10:44:22 AM
Site: across from Mt Nittany United Methodist Church, NB

Time of Day: 0:00 to 23:59
Dates: 10/15/2014 to 10/21/2014 (Su, M, T, W, Th, F Sa)

### OVERALL SUMMARY

Total Days of Data: 7
Speed Limit: 25
Average Speed: 30.09
Mini Speed: 5
50th Percentile Speed: 29.62
85th Percentile Speed: 34.95
Pace Speed Range: 26 to 50
Max Speed: 88
Display Status: Mixed Display
Average Volume Per Day: 3,723.1
Total Volume: 26,062

| HOURS | SIGN MODE | SPEED LIMIT | TOTAL # VEHICLES | TOTAL # VIOLATIONS | % VIOLATIONS | AVG VEHICLES | AVG VIOLATIONS | MIN SPEED RECORDED | MAX SPEED RECORDED | AVG SPEED | 50% SPEED | 85% SPEED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0:00 | Speed Display | 25 | 145.0 | 32.0 | 22.1% | 20.7 | 4.6 | 17.0 | 47.0 | 31.0 | 30.6 | 35.9 |
| 1:00 | Speed Display | 25 | 101.0 | 22.0 | 21.8% | 14.4 | 3.1 | 5.0 | 52.0 | 31.7 | 30.8 | 34.7 |
| 2:00 | Speed Display | 25 | 65.0 | 13.0 | 20.0% | 9.3 | 1.9 | 5.0 | 51.0 | 31.6 | 30.6 | 37.0 |
| 3:00 | Speed Display | 25 | 45.0 | 5.0 | 11.1% | 6.4 | 0.7 | 6.0 | 45.0 | 30.6 | 31.7 | 33.4 |
| 4:00 | Speed Display | 25 | 92.0 | 18.0 | 19.6% | 13.1 | 2.6 | 20.0 | 63.0 | 32.5 | 31.1 | 35.5 |
| 5:00 | Speed Display | 25 | 204.0 | 39.0 | 19.1% | 29.1 | 5.6 | 5.0 | 88.0 | 31.1 | 29.4 | 36.3 |
| 6:00 | Speed Display | 25 | 481.0 | 51.0 | 10.6 | 68.7 | 7.3 | 6.0 | 51.0 | 29.4 | 29.1 | 34.4 |

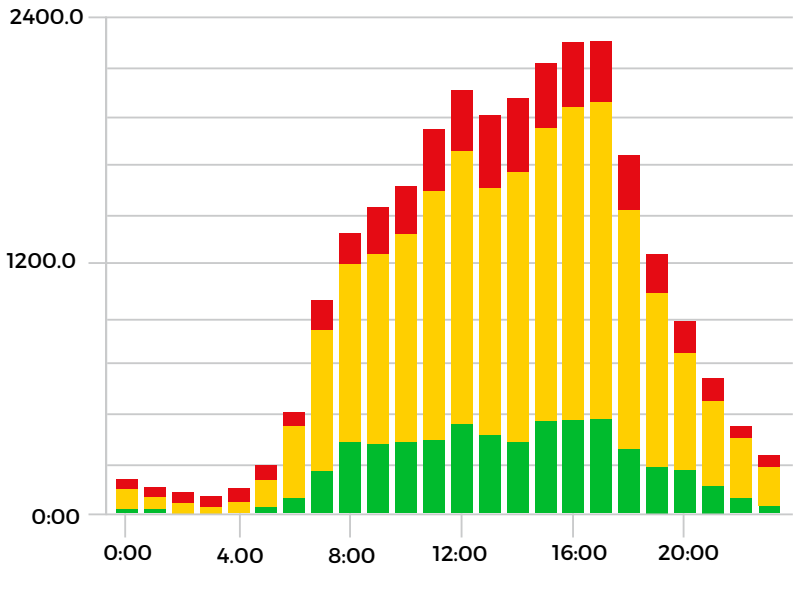
## VOLUMES BY COMPLIANCE AND SIGN EFFECTIVENESS

Volume by compliance, by user established threshold. Traffic sign effectiveness by percentage of vehicles slowed down.

## SIGN EFFECTIVENESS

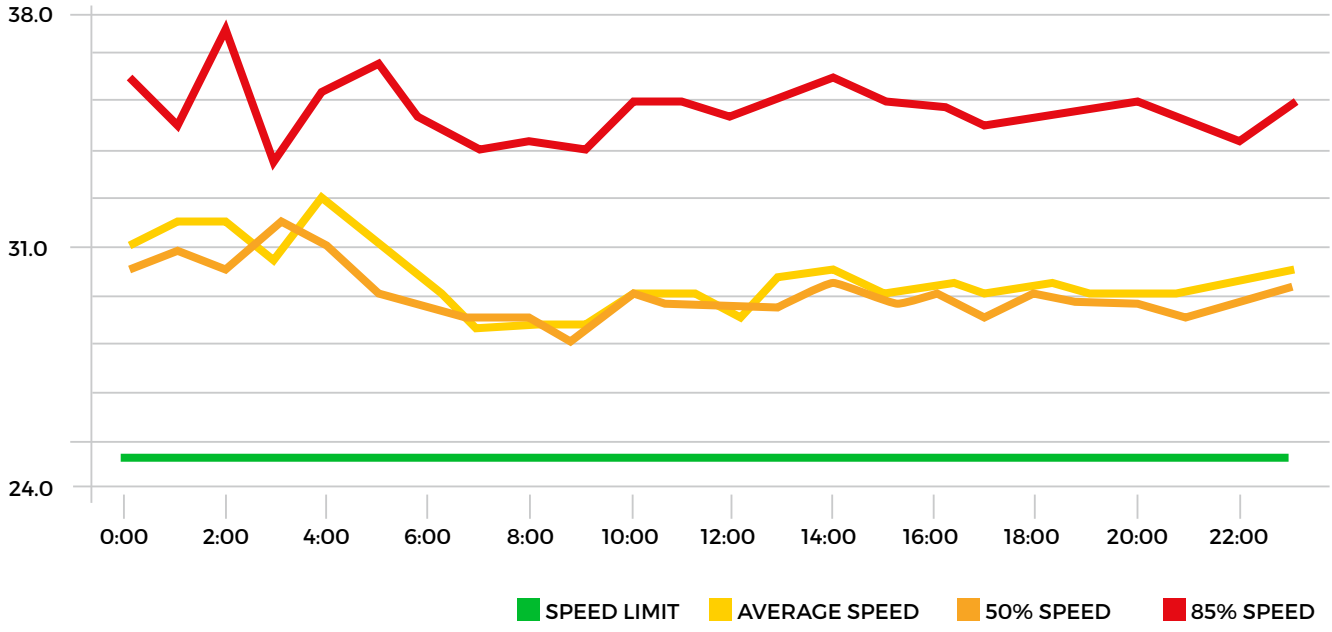
VEHICLES SLOWED OTHER

## VOLUMES BY COMPLIANCE



## SPEED LIMIT VS. AVERAGE SPEED

Speeds relative to the Speed Limit – 85%, 50% and Average.
The 85th percentile speed is the speed under which 85% of the traffic is traveling.




## TRAFFICLOUD ENFORCEMENT PRIORITIES REPORT

Prioritizes sites, times of the day and day of the week for the most effective enforcement activity.
Priorities by the 85% speed, or a weighted analysis skewed towards either speed or volume.

### ALL TRAFFIC SOLUTIONS: ENFORCEMENT PRIORITIES REPORT

**Generated by Ted Graef from All Traffic Solutions Software Developer Account on 10/22/2014 at 1:41:22 PM**
**Speed Bin Range: 1 to 100**
**Site: Across from Mt Nittany United Methodist Church, NB**

**Time of Day: 0:00 to 23:50**
**Dates: 9/22/2014 (Su, M, T, W, Th, F, Sa)**
**Rank Results By Speed and Volume 24% Speed, 76% Volume**

| RANK | SITE | DAY OF THE WEEK | TIME | SPEED LIMIT | AVG SPEED | AVG VIOLATION SPEED | 85% SPEED | AVG # VEHICLES | AVG # VIOLATION |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Across from Mt Nittany United Methodist Church, NB | Saturday | 15:00-16:00 | 25 | 31.0 | 39.8 | 289.0 | 289.0 | 73.0 |
| 2 | Across from Mt Nittany United Methodist Church, NB | Saturday | 15:00-16:00 | 25 | 32.0 | 39.8 | 268.0 | 268.0 | 64.0 |
| 3 | Across from Mt Nittany United Methodist Church, NB | Saturday | 17:00-18:00 | 25 | 30.0 | 39.4 | 391.0 | 391.0 | 63.0 |
| 4 | Across from Mt Nittany United Methodist Church, NB | Friday | 17:00-18:00 | 25 | 30.0 | 39.5 | 416.0 | 416.0 | 62.0 |
| 5 | Across from Mt Nittany United Methodist Church, NB | Saturday | 14:00-15:00 | 25 | 32.0 | 38.8 | 238.0 | 238.0 | 59.0 |
| 6 | Across from Mt Nittany United Methodist Church, NB | Monday | 15:00-16:00 | 25 | 30.1 | 39.4 | 36.0 | 366.0 | 58.0 |
| 7 | Across from Mt Nittany United Methodist Church, NB | Saturday | 11:00-12:00 | 25 | 31.0 | 38.5 | 36.0 | 311.0 | 58.0 |

## TRAFFICLOUD COMPLIANCE REPORT

Volume of traffic in each compliance range by hour, day or week.
Thresholds for medium and high risk speeds to visualize compliance at a site.

### ALL TRAFFIC SOLUTIONS: COMPLIANCE AND RISK REPORT

Generated by Ted Graef from All Traffic Solutions Software Developer
Account on: 10/22/2014 at 9:29:13 AM
Speed Bin Range: 1 to 7
Time View: By Day of Week (Avg Volume)
Site: Across from Mt Nittany United Methodist Church, NB

Time of Day: 0:00 to 23:59
Dates: 10/15/2014 to 10/21/2014 (Su, M, T, W, Th, F Sa)
Medium Risk Threshold: Speed Limit + 5
High Risk Threshold: Speed Limit + 15

| DATE/ TIME RANGE | SPEED LIMIT | SIGN MODE | COMPLIANT | LOW RISK | MEDIUM RISK | HIGH RISK | TOTAL # VEHICLES |
|---|---|---|---|---|---|---|---|
| Sunday | 25 | Speed Display | 519 | 1033 | 1198 | 184 | 2935 |
| Monday | 25 | Speed Display | 811 | 1588 | 1452 | 121 | 3972 |
| Tuesday | 25 | Speed Display | 1029 | 1560 | 1169 | 68 | 3826 |
| Wednesday | 25 | Speed Display | 969 | 1601 | 1403 | 92 | 4065 |
| Thursday | 25 | Speed Display | 913 | 1555 | 1391 | 130 | 3989 |
| Friday | 25 | Speed Display | 720 | 1656 | 1751 | 158 | 4285 |
| Saturday | 25 | Speed Display | 476 | 1179 | 1315 | 165 | 3135 |
| Avg # Vehicles | | | 776.7 | 1453.1 | 1382.7 | 131.1 | 3743.9 |

## COMPLIANCE BY VOLUME

Compliance by volume is best analyzed when traffic volume varies significantly over the time range, such as when the night and day volumes are significantly different. At night a higher percentage of vehicles are non-compliant, but the volume is very low so only a few cars can raise the overall percentage of non-compliance.