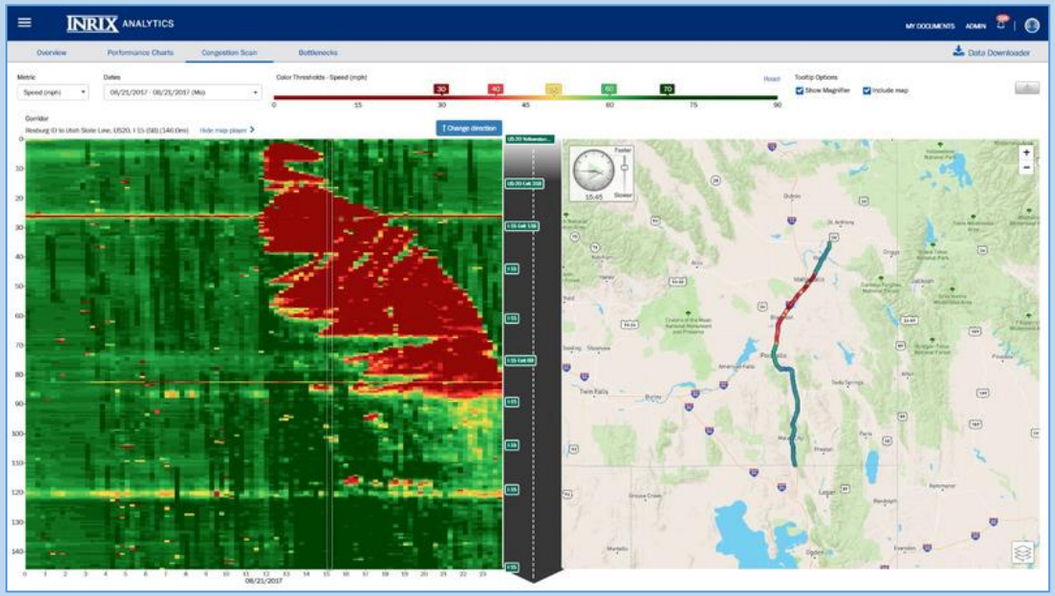
INRIX Eclipse Traffic

Measuring the effects of the 2017 solar eclipse on truck traffic flows and speed in real-time using GPS and cell phone data.

CASE STUDY

Freight Challenges	Congestion
Data Sources Used	Global Positioning System
Analytical Approaches	Speed, Location



INRIX Visualization of Congestion
Source: INRIX.com/research

WHAT ARE THE FREIGHT CHALLENGES?

Congestion is a common impediment to the efficient movement of freight, as it reduces travel speeds, increases travel times, and results in higher costs to move goods. Thanks to improvements in traffic data collection and forecasting, carriers can plan and account for or avoid some kinds of congestion, such as morning and evening rush hour. However, unexpected congestion resulting from events such as accidents, natural disasters, or major social events such as concerts or sports games can be harder to predict. Collecting and communicating real-time information about traffic conditions can help trucks and all road users avoid or anticipate these unique congestion events, and can help public agencies improve management and operation of their road networks.

WHAT WAS THE GOAL OF THE PROJECT?

The August 21, 2017 solar eclipse is a good example of an unusual congestion event. The shadow of the eclipse occurred over a large portion of the continental US, in an arc stretching southeast from Oregon to South Carolina. Millions of people drove to the center of the eclipse's path to witness it, and this tremendous increase in traffic, particularly in rural areas and smaller cities had major impacts on traffic congestion, affecting the travel times of trucks. INRIX sought to collect and communicate real-time information on the exceptional congestion associated with this rare event.

WHAT DATA SOURCES WERE USED?

INRIX used data on the location and speed of vehicles to track the traffic effects of the eclipse. The company collects GPS-derived traffic speed information from a variety of sources, including some applications installed on personal cell phones, and the manufacturer-installed GPS navigation units in some brands of cars and trucks. These units communicate with INRIX's centralized data systems via 4G cellular networks, and are also capable of receiving real-time traffic information as an aid to navigation. Other sources include roadside infrastructure, and cell phone tower data.

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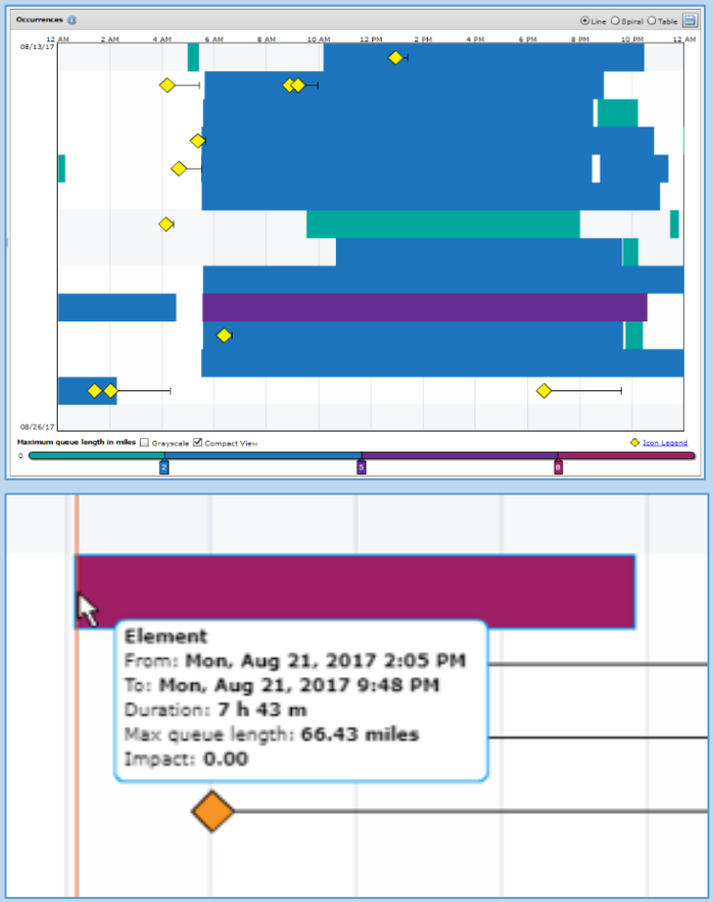

INRIX Eclipse Data on Google Maps
Source: Behance, INRIX Eclipse Maps. [Online]. Available: https://www.behance.net/gallery/59368063/INRIX-Eclipse-Traffic-Map

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WHAT ANALYTICAL APPROACHES WERE APPLIED?

Using these millions of real-time records of vehicles' time, speed, and location, INRIX could calculate estimates of travel speed and travel time, and publish this information in real-time on a specially-created eclipse website, this information was also archived for later analysis. After the eclipse and its associated traffic congestion had passed, INRIX could use its large archives of traffic data for advanced analysis of congestion, such measurement of bottleneck length and duration during the eclipse, and comparison of these measures against normal congestion. Bottlenecks were defined as events where traffic speed was below 60% of the recorded free-flow speed for each segment for more than 5 minutes. The INRIX Insights system is capable of applying these rules to millions of observations of vehicle speed to automatically identify bottlenecks. Once bottlenecks are identified, the system can also identify the length of the bottleneck in miles, and its duration in time. These bottleneck events could then be compared against historic bottleneck trends to determine the severity of eclipse congestion relative to normal congestion.

WHAT WERE THE RESULTS?

During the eclipse, INRIX provided real-time traffic and travel time information on a specially-created website. After the event, the INRIX Insights and Analytics systems were used to help analyze and visualize congestion events. The image at left above shows the Insights system's visualization of one week of bottlenecks observed on I-71 near Cincinnati. The purple line shows exceptional congestion the evening of August 21, after the eclipse. The image at left below shows additional information available via the Insights system. For example, information on a nearly 8 hour, 66-mile bottleneck in Georgia occurring after the eclipse had passed. The Analytics system is capable of showing how congestion progresses along a corridor over time. The image on the previous page shows the movement of traffic congestion (in red) southward along a 146-mile corridor (top to bottom) over time (right to left) before and after the eclipse.

HOW WERE THE RESULTS VISUALIZED OR COMMUNICATED?

INRIX's work demonstrates the value of visualizations in analyzing the time and location of congestion events. Relatively straightforward visualizations are important for two reasons, first, they help analysts and planners identify patterns and trends more easily, and second, these visualizations can be easily understood by decision-makers, or people with less familiarity with traffic congestion measures. This ease of understanding can help improve communications and decision making processes.