INRIX

# Global Traffic Scorecard

INRIX Research • Trevor Reed • March 2020

# ABOUT INRIX RESEARCH

Launched in 2016, INRIX Research uses INRIX proprietary big data and expertise to make the movement of people and goods more efficient, safer and convenient.

We achieve this by leveraging billions of anonymous data points every day from a diverse set of sources on all roads in countries of coverage. Our data provides a rich and fertile picture of urban mobility that enables INRIX Research to produce valuable and actionable insights for policy makers, transport professionals, automakers, and drivers.

The INRIX Research team has researchers in Europe and North America, and is comprised of economists, transportation policy specialists and data scientists with backgrounds from academia, think tanks and commercial research and development groups. We have decades of experience in applying rigorous, cutting-edge methodologies to answer salient, real-world problems.

INRIX Research will continue to develop the INRIX Traffic Scorecard as a global, annual benchmark as well as develop new industry-leading metrics and original research reports. In addition to our research outputs, INRIX Research is a free and valuable resource for journalists, researchers and policymakers. We are able to assist with data, analysis and expert commentary on all aspects of urban mobility and smart cities. Spokespeople are available globally for interviews.

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# INTRODUCTION

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Congestion continues to grow across the world with continued urbanization and population growth. The impacts of vehicle travel are pervasive, including air pollution, time loss, and road fatalities. However, emergent technologies such as shared micromobility and the rise in people opting to walk, bike and take public transport has led to a rapidly changing mobility landscape. Within this complex and evolving landscape, INRIX 2019 Global Traffic Scorecard provides valuable mobility insights across modes and between cities.

The 2019 Scorecard builds upon the methodology adopted in 2018, with the goal to provide a more granular and holistic analysis of mobility within the world's most congested cities. New additions to the 2019 Scorecard include commute mode (bicycle and public transport) travel time comparisons, incident congestion impacts, and the incorporation of multiple commutes within each metro. Combined with drive-time maps and last-mile speeds, these advanced metrics provide a unique basis for cross-national commuting comparisons and analysis.

INRIX collects billions of anonymous data points every day from a diverse set of sources, including connected vehicles, cities, Departments of Transportation (DOTs), road weather conditions, journalistic incidents, social media, parking, mobile and other Internet of Things (IoT) devices. With coverage on all roads in countries of coverage, and lane by lane precision, INRIX is the preferred provider of driving and mobility intelligence for leading automakers.

1 United States of America. Federal Highway Administration. U.S. Department of Transportation. Definition, Interpretation, and Calculation of Traffic Analysis Tools Measures of Effectiveness. By Richard Dowling. Vol. VI. Traffic Analysis Tool Box. Washington, D.C.: U.S. Federal Highway Administration, Office of Operations, 2007.

2 Ibid.

# CONGESTION EXPLAINED



## Congestion at the most basic level can be described as the demand for road space exceeding supply. However, the critical phenomenon known as 'facility breakdown' is frequently underappreciated. Facility breakdown occurs when a road cannot effectively accommodate more vehicles, which causes a decrease in the roadway's overall capacity as more vehicles try to force their way onto the roads.[1]

Highways designed to operate safely at speeds of 60 MPH, can move nearly 2,300 cars per lane per hour at 45 MPH. The same roadway may carry fewer than 700 cars per lane during facility breakdown.[2] Facility breakdown is why expansion and congestion relief measures frequently fail as the supply of road-space cannot increase enough to escape this trap. While this example pertains to highways, every road and/or road network is subject to facility breakdown.

INRIX Research recognizes that commute duration remains mostly constant across cities worldwide, irrespective of congestion levels. On average, commuters are unwilling to spend more than one hour per day commuting.[3] Trip times are kept in check by increased housing density, household relocation, and greater mobility via infrastructure improvements.[4]

According to INRIX data, travel speeds, congestion rates and time loss positively correlate with population and city density. However, motorists in high congestion cities do not typically travel as far since they are geographically closer to more destinations.[5] It is the driving experience that differs most across cities, not the duration of trips. Typically, dense cities experience low speeds and shorter commute distances in contrast to low-density cities which exhibit higher speeds, but longer distances traveled. In both contexts, commuters spend approximately a half-hour on average communting to or from work.

One notable exception to this trend is Singapore. With aggressive anti-congestion policies, including high vehicle ownership fees and congestion tolls, the city's road network continues to facilitate high-speeds despite high urban density.[6] Charging for road space curtails the incidence and impact of facility breakdown. In Barcelona, Madrid, Paris and Zurich, authorities actively pursue policies that reduce roadway performance and capacity in favor of public transport, biking, and walking.[7] The reprioritization of street space from vehicles to alternative uses, including bus lanes, bike lanes, and loading zones is a trend that continues to gain momentum globally. Within the United States, the banning of private vehicles on Market Street in San Francisco, and the highly successful 14th Street Busway in New York City are prime examples. When interpreting the 2019 Global Traffic Scorecard's results, understanding the context of road performance within a city's broader mobility framework is critical.

3 Marchetti, C. "Anthropological Invariants in Travel Behavior." Technological Forecasting and Social Change47, no. 1 (1994): 75-88. doi:10.1016/0040-1625(94)90041-8.

4 Angel, Shlomo, and Alejandro M. Blei. "The Productivity of American Cities: How Densification, Relocation, and Greater Mobility Sustain the Productive Advantage of Larger U.S. Metropolitan Labor Markets." Cities51 (2016): 36-51. doi:10.1016/j.cities.2015.11.030.

5 Osman, Taner, Trevor Thomas, Andrew Monschein, and Brian Taylor. Not So Fast: A Study of Traffic Delays, Access, and Economic Activity in the San Francisco Bay Area. Report. Luskin School of Public Affairs, UCLA Institute of Transportation Studies. Los Angeles, CA: UCLA, 2016.

6 Goh, Mark. "Congestion Management and Electronic Road Pricing in Singapore." Journal of Transport Geography10, no. 1 (2002): 29-38. doi:10.1016/s0966-6923(01)00036-9.

7 Rosenthal, Elisabeth. "Across Europe: Irking Drivers Is Urban Policy." The New York Times (New York City), June 26, 2011.

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# DATA AND METHODOLOGY

**The most noticeable change to the 2019 Traffic Scorecard is the refinement of commute destinations within each urban area. Previously, commute times were calculated by looking exclusively at the time it takes to get to and from the downtown core from surrounding commuter neighborhoods.**

However, many cities have multiple major employment centers. To rectify this shortcoming, the 2019 Global Traffic Scorecard used anonymized observed trips to identify the most frequented routes and destinations throughout a region to create a more accurate portrayal of commuting for a region, not just to and from a downtown core. The methodological change resulted in a reduction in average delays due to a wider range of commuter behaviors now being included. With this increased level of detail, INRIX Research was able to calculate the additional time spent commuting due to traffic between multiple points within a region, which can be explored further on the Scorecard interactive city pages.

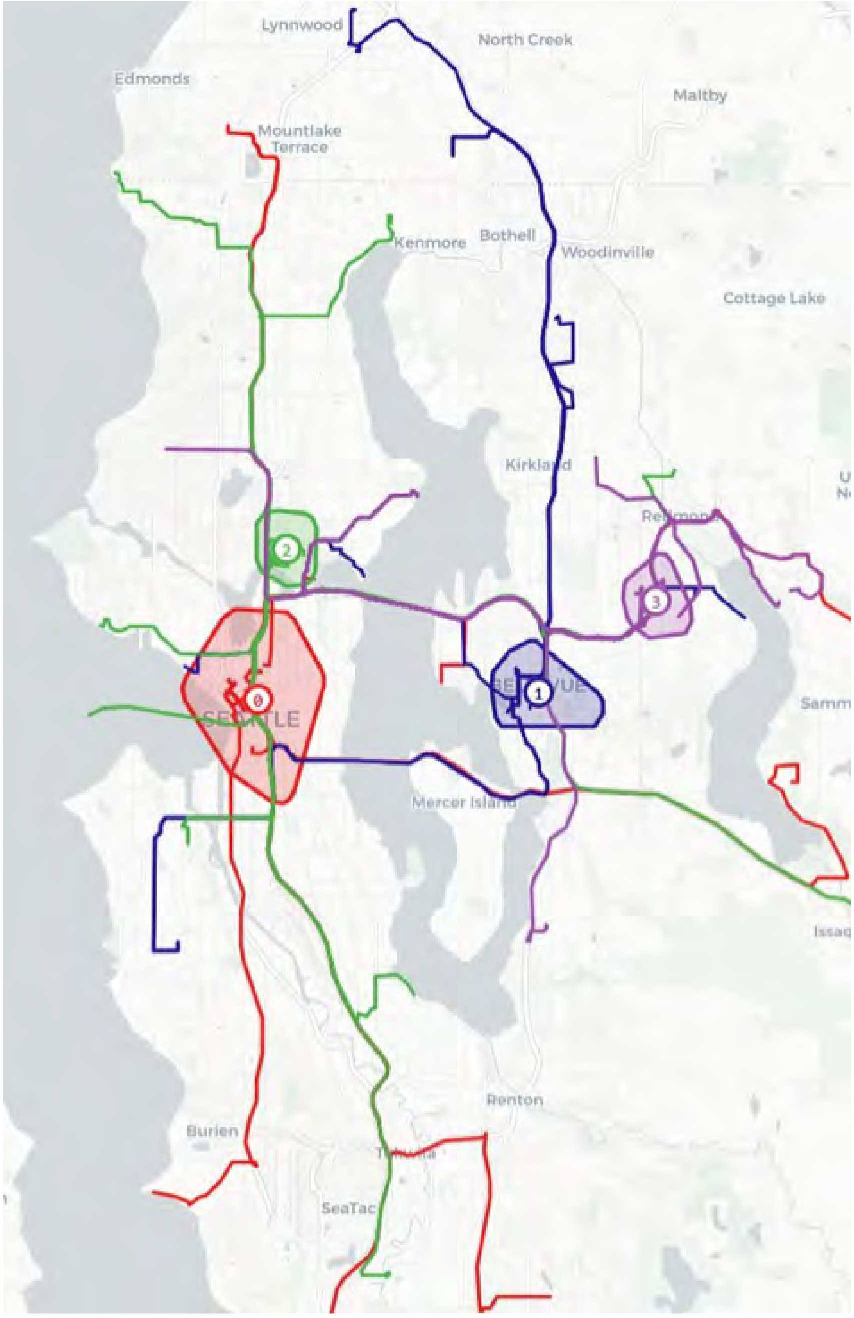
The 2019 Scorecard calculates time loss by analyzing peak speed and free flow speed data for the busiest commuting corridors and sub areas as identified by data density. Peak corresponds to the absolute worst portion of the morning and afternoon commute. Off-peak is the low point between the peak periods. Free flow is the best performance experienced over 24 hours. Employing free-flow data enables a direct comparison between peak and off-peak periods and serves as the basis for calculating time loss. Total time lost is the difference in travel times experienced during the peak and off-peak periods compared to free flow conditions on a per capita basis.

The methodological differences' impact is apparent when analyzing the Seattle metropolitan area. Within the region, four major commuting centers were identified based on anonymous trip data, and commutes for each regions were analyzed. Overall, commuters in the Seattle area lost 74 hours per year due to congestion, however, the amount of time lost changed significantly when analyzing subareas. Commuters to downtown Seattle lost 99 hours per year to congestion in conrast to commuters to Redmond (Microsoft's headquarters) who lost 41 hours per year. The map below shows both commute subaraeas and highest volume routes for the Seattle area.

For the first time, the impact of incidents on congestion is analyzed. Drawing on INRIX global incident and congestion data and analysis, INRIX Research was able to calculate the relative impact of incidents on travel time delays in cities for the U.S., U.K., and Germany.

Also new to the 2019 Global Traffic Scorecard, INRIX Research calculated trip times for both biking and public transport for the same routes from which vehicle delay is calculated. These calculations determine the feasibility of driving alternatives for the most heavily trafficked commuting corridors in each city of study.

The 2019 Global Traffic Scorecard uses three years of historical data to provide a complete year-over-year comparison of congestion and mobility. A multi-year approach enables the identification of trends in the world's largest cities and provides a basis for comparison.




| CODE | AREA | PEAK SPEED (MPH) | FREE FLOW (MPH) | LAST MILE PEAK (MPH) | LAST MILE FREE FLOW (MPH) | TIME LOSS |
|---|---|---|---|---|---|---|
| 0 | Downtown Seattle | 22 | 41 | 11 | 17 | 99 |
| 1 | Bellevue | 26 | 43 | 14 | 19 | 75 |
| 2 | University District | 22 | 39 | 12 | 19 | 96 |
| 3 | Redmond | 31 | 42 | 16 | 20 | 41 |

## Definitions:

**Impact Rank:** A calculated commute based upon a city's population and the delay attributable to congestion.

**Urban Area:** The geographic scope of a city as defined by its road network density.

**Hours Lost in Congestion:** The total number of hours lost in congestion during peak commute periods compared to free-flow conditions.

**Year-Over-Year Change:** The percentage difference in hours lost in congestion in 2019 and 2018

**Last Mile Speed:** The speed at which a driver can expect to travel one mile into the central business district during peak hours.

**Peak:** The absolute worst portion of the morning and afternoon commute.

**Off-Peak:** The low point between the morning and afternoon commute periods.

**Free-Flow:** The best speed performance experienced over 24 hours.

**Time Lost:** The travel times difference between the peak and off-peak periods compared to free flow conditions.

**Incident Impact:** The influence of incidents on travel time delays.

**Bike and Public Transport:**

- **Green:** Less than 50% difference than a vehicle commute.
- **Yellow:** 50-100% difference than a vehicle commute.
- **Red:** Greater than 100% difference than a vehicle commute.

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# ECONOMIC IMPACTS

The economic impacts associated with driving are pervasive, complex, and dynamic. To understand the burden congestion places on each driver and the economy, INRIX Research estimates the costs of congestion in the U.S., U.K., and Germany.

### Time Loss to Passenger and Freight

Time loss is the excess amount of time taken on a trip caused by congestion. The cost of congestion depends upon the labor market, industrial sector, mode of transport, trip distance and travel conditions.[8] Two preferred methods for developing estimates for work and non-work passengers' travel time savings (non-freight movements) are revealed preference method and the cost-saving approach.[9] Given the limited availability of this data, creating a definitive answer for the costs of time loss for passengers is difficult. However, ranges are derived for cities in the U.S., U.K., and Germany based upon U.S Department of Transportation guidance.[10] Costs were then calculated in local currencies using 2019 values.

Congestion also increases the costs of freight movement via reduced driver productivity, higher operating costs and decreased reliability.[11] A high degree of variability exists between cities due to local economic conditions and the type of goods transported. For example, the impacts of delays on perishable goods are much higher than durable goods. Thus, the costs of congestion vary dramatically between cities. However, the American Transportation Research Institute estimates the total cost of congestion in the freight sector to be $74.5 billion annually, with $66.1 billion of it occurring in urban areas in 2018.[12]

### Congestion as an Economic Indicator

While congestion is responsible for costs resulting from time loss, increased pollution rates, and higher incidents of accidents, its presence is indicative of positive economic trends and a city's desirability. The occurrence of many of the world's most dynamic cities in this report should serve as no surprise. Higher density and population correlate directly with economic growth and innovation rates, while their co-occurrence has a multiplier effect.[13] The larger and denser the city, the more significant the benefits accrued to an individual city.

Agglomeration economics is the phenomenon of increasing productivity as a function of size and density.[14] For example, in 2017, the Top 5 largest metros in the U.S. by GDP accounted for 26 percent of the nation's GDP, but represented only 17 percent of the nation's population.[15, 16] While congestion itself has little intrinsic worth, it's symptomatic of economic vitality. In the medium- and long-term, congestion can positively impact a city by incentivizing land use changes and driving investment in high-efficiency modes of transport (public transport, biking, walking). These investments reinforce agglomeration economics, amplifying their impact.

# RANKINGS

## Global Ranking

Bogota, Rio de Janeiro, Mexico City, Istanbul, and Sao Paulo comprise the Top 5 most congested cities in the Global Congestion Impact ranking due to their large populations and severe congestion. When ranking by hours lost in congestion, four of the Top 10 cities are South American, three European, and two North American. The impact score captures the aggregate impact of congestion's impact relative to population, wheras hours lost in congestion captures exclusively the intensity of traffic in a given city.



In general, the most congested cities in the world are either older or rapidly growing cities. High density development patterns characteristic of pre-automobile cities, as found in the most congested European and North American cities, like Paris and Boston, makes them particularly ill-suited to the movement of vehicles. In contrast to these older cities, South American cities, like Bogota and Quito, are combatting extreme population growth, in geographically constrained environments, with underdeveloped infrastructure. This trendline is reflected in last mile speeds, where three of the four cities with speeds less than 10 MPH are in Europe with the fourth being in South America.

8 Sartori et.al. Guide to Cost-Benefit Analysis of Investment Projects: Economic Appraisal Tool for Cohesion Policy 2014-2020.

9 Ibid.

10 United States. Department of Transportation. Office of the Secretary of Transportation. Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis.

11 Ibid.

12 Hooper, Alan. Cost of Congestion to the Trucking Industry: 2018 Update. Report. American Transportation Research Institute. Atlanta, GA, 2018.

13 Glaeser, Edward, and Joshua Gottlieb. "The Economics of Place-Making Policies." 2008. doi:10.3386/w14373.

14 Ibid.

15 U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

16 U.S. Department of Commerce. Bureau of Economic Analysis. "Gross Domestic Product by Metropolitan Area, 2017." News release. https://www.bea.gov/system/files/2018-09/gdp_metro0918_0.pdf.



* The Impact Ranking includes a weighting based on city population

### INRIX Top 25 Most Congested Cities in the World

| 2019 IMPACT RANK (2018 IMPACT) | URBAN AREA | COUNTRY | REGION | HOURS LOST IN CONGESTION (RANK 2019) | 2018-2019 CHANGE | 2017-2018 CHANGE | LAST MILE SPEED (MPH) | BIKE | TRANSIT |
|---|---|---|---|---|---|---|---|---|---|
| 1 (2) | Bogota | Colombia | South America | 191 (1) | 3% | 1% | 9 | | |
| 2 (1) | Rio de Janeiro | Brazil | South America | 190 (2) | -5% | -1% | 11 | | |
| 3 (5) | Mexico City | Mexico | North America | 158 (6) | 2% | 1% | 12 | | |
| 4 (9) | Istanbul | Turkey | Asia | 153 (8) | 6% | 3% | 11 | | |
| 5 (10) | São Paulo | Brazil | South America | 152 (9) | 5% | 1% | 13 | | |
| 6 (7) | Rome | Italy | Europe | 166 (3) | 1% | 2% | 11 | | |
| 7 (4) | Paris | France | Europe | 165 (4) | -4% | -5% | 10 | | |
| 8 (3) | London | United Kingdom | Europe | 149 (12) | -9% | -4% | 10 | | |
| 9 (6) | Boston, MA | United States | North America | 149 (12) | -5% | 9% | 12 | | |
| 10 (13) | Chicago, IL | United States | North America | 145 (14) | 4% | 4% | 11 | | |
| 11 (12) | Saint Petersburg | Russia | Europe | 151 (10) | 3% | 12% | 14 | | |
| 12 (8) | Philadelphia, PA | United States | North America | 142 (16) | 4% | 11% | 10 | | |
| 13 (14) | Belo Horizonte | Brazil | South America | 160 (5) | 3% | -6% | 12 | | |
| 14 (16) | New York City, NY | United States | North America | 140 (17) | -4% | 0% | 11 | | |
| 15 (11) | Dublin | Ireland | Europe | 154 (7) | -4% | 4% | 10 | | |
| 16 (21) | Jakarta | Indonesia | Oceania | 150 (11) | 5% | 8% | 18 | | |
| 17 (18) | Moscow | Russia | Europe | 128 (23) | -2% | 10% | 15 | | |
| 18 (20) | Quito | Ecuador | South America | 144 (15) | 0% | -6% | 10 | | |
| 19 (17) | Toronto ON | Canada | North America | 135 (21) | -6% | 12% | 11 | | |
| 20 (19) | Brussels | Belgium | Europe | 140 (17) | -7% | -4% | 9 | | |
| 21 (15) | Washington DC | United States | North America | 124 (24) | -11% | -6% | 10 | | |
| 22 (23) | Guayaquil | Ecuador | South America | 130 (22) | 4% | -4% | 13 | | |
| 23 (24) | Sydney | Australia | Oceania | 119 (27) | 3% | -9% | 15 | | |
| 24 (25) | Palermo | Italy | Europe | 137 (19) | 5% | 8% | 8 | | |
| 25 (22) | Lisboa | Portugal | Europe | 136 (20) | -9% | 11% | 10 | | |

## The United States:

Drivers in Boston, Chicago, and Philadelphia lose the most time annually to traffic congestion with 149, 145, and 142 hours, respectively. Their geography, age and density create road networks that enter severe breakdown once traffic strikes. It is critical to note that variations in hours lost between the 2018 and 2019 Scorecard results are primarily attributable to the incorporation of multiple commute centers within a region, which can be explored in greater detail online.



Philadelphia, Washington, D.C. and San Francisco all have the distinction of having the slowest last mile travel speeds in the country (10 MPH), while Los Angeles and Austin (16 MPH) have the fastest last mile speeds in the Top 25. The high speeds observerd in Austin and Los Angeles can be attributed to greater highway coverage than that found in many other cities. Incidents appear to play a moderate role in most American cities in terms of their impact in the country's most congested cities.

Overall, the average American driver lost 99 hours a year in traffic in 2019, costing $1,377. Nationally, drivers lost more than $88 billion in time to congestion. Interestingly, the five most congested cities in the U.S. are also the only cities to receive the highest score for public transit trips to replace car trips. It is attributable to these being amongst the oldest and densest cities in the country with much of their development occurring around public transport. The factors that make these cities difficult to drive in, also makes them the most attractive for using alternative modes.

**INRIX Top 25 Most Congested Cities in the U.S.**

| 2019 CONGESTION RANK (2018) | URBAN AREA | HOURS LOST IN CONGESTION | 2018-2019 CHANGE | 2017-2018 CHANGE | INCIDENT IMPACT | COST PER DRIVER | TOTAL COST PER CITY | BIKE | TRANSIT | LAST MILE SPEED (MPH) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 (1) | Boston, MA | 149 | -5% | 3% | | $2,205 | $4.1B | | | 12 |
| 2 (3) | Chicago, IL | 145 | 4% | 0% | | $2,146 | $7.6B | | | 11 |
| 3 (5) | Philadelphia, PA | 142 | 4% | 5% | | $2,102 | $4.5B | | | 10 |
| 4 (2) | New York City, NY | 140 | -4% | -3% | | $2,072 | $11B | | | 11 |
| 5 (3) | Washington DC | 124 | -11% | 4% | | $1,835 | $4.1B | | | 10 |
| 6 (7) | Los Angeles, CA | 103 | 4% | -8% | | $1,524 | $8.2B | | | 16 |
| 7 (6) | San Francisco, CA | 97 | -8% | -4% | | $1,436 | $3B | | | 10 |
| 8 (9) | Portland, OR | 89 | 10% | -7% | | $1,317 | $1.2B | | | 14 |
| 9 (11) | Baltimore, MD | 84 | 5% | 9% | | $1,243 | $1.3B | | | 10 |
| 10 (12) | Atlanta, GA | 82 | 9% | -3% | | $1,214 | $3.0B | | | 12 |
| 11 (8) | Houston, TX | 81 | -9% | 4% | | $1,199 | $3.7B | | | 15 |
| 11 (9) | Miami, FL | 81 | 0% | 1% | | $1,199 | $3.5B | | | 15 |
| 13 (14) | New Orleans, LA | 79 | 10% | 3% | | $1,169 | $500M | | | 12 |
| 14 (12) | Seattle, WA | 74 | -1% | 7% | | $1,095 | $1.8B | | | 13 |
| 14 (15) | Stamford, CT | 74 | 6% | 4% | | $1,095 | $500M | | | 13 |
| 16 (16) | Providence, RI | 70 | 9% | -6% | | $1,036 | $800M | | | 17 |
| 16 (17) | San Diego, CA | 70 | 9% | 8% | | $1,036 | $1.4B | | | 13 |
| 18 (18) | Austin, TX | 69 | 13% | -5% | | $1,021 | $1.0B | | | 16 |
| 19 (19) | Sacramento, CA | 64 | 7% | 8% | | $947 | $800M | | | 14 |
| 20 (20) | Dallas, TX | 63 | 13% | 7% | | $932 | $2.9B | | | 15 |
| 20 (20) | Denver, CO | 63 | 13% | 9% | | $932 | $1.4B | | | 10 |
| 22 (22) | Hartford, CT | 61 | 3% | 3% | | $903 | $500M | | | 14 |
| 23 (24) | Minneapolis, MN | 52 | 16% | 7% | | $770 | $1.1B | | | 13 |
| 24 (26) | Charlotte, NC | 49 | 14% | 2% | | $725 | $600M | | | 15 |
| 25 (25) | San Juan, PR | 46 | 5% | -5% | | $681 | $400M | | | 16 |

### Top 10 Worst US Corridors

Los Angeles has three of the Top 10 most congested corridors in the country, followed by New York City and Chicago with two apiece. Surprisingly, Boston, Philadelphia, and Washington, D.C. do not have any corridors in the Top 10, despite placing in the Top 5 for congestion nationally. It is attributable to congestion being more evenly distributed across their metros, instead of concentrated on a few major Interstates.

**INRIX Top 10 Worst Corridors in the U.S.**

| RANK | CITY | ROAD NAME | FROM | TO | DAILY DELAY (MINUTES) | YEARLY DELAY (HOURS) |
|---|---|---|---|---|---|---|
| 1 | Los Angeles | I-5 | I-10 | I-605 | 20 | 80 |
| 2 | Los Angeles | US-101 | CA-134 | CA-110 | 19 | 76 |
| 3 | New York City | Brooklyn Queens Expressway | Brooklyn-Battery Tunnel | I-495 | 17 | 68 |
| 4 | New York City | I-95 | Bruckner Expressway | George Washington Bridge | 16 | 64 |
| 5 | Atlanta | I-85/I-75 | T. Mathis Parkway | College Park | 16 | 64 |
| 6 | Austin | I-35 | West Slaughter Lane | East Dean Keaton Street | 16 | 64 |
| 7 | Tampa Bay | I-275 | St. Petersburg | North Tampa Street | 15 | 60 |
| 8 | Chicago | I-290 | I-294 | I-90 | 14 | 56 |
| 9 | Los Angeles | I-405 | US-101 | I-105 | 14 | 56 |
| 10 | Chicago | I-90/I-94 | I-294 | I-290 | 13 | 52 |

## Europe

European cities place amongst the slowest globally due to the vast majority of their growth occurring prior to widespread adoption of the automobile. Dense cores, narrow roads and complex road networks makes these cities ill-suited for car-based mobility. Rome leads European cities with drivers spending 166 hours per year in congestion, followed by Paris, Dublin, and Saint Petersburg where drivers lose 165, 154, and 151 hours per year due to congestion respectively.

Luckily for the residents of most European cities, robust public transport networks and viable biking and walking routes offer appealing alternatives to vehicles. Paris in particular is undergoing a revolution in transportation with massive investments in biking, scooter and public transport throughout the metro region.

**INRIX Top 25 Most Congested Cities in Europe**

| 2019 IMPACT RANK (2018 IMPACT) | URBAN AREA | COUNTRY | HOURS LOST IN CONGESTION (RANK 2019) | 2018-2019 CHANGE | 2017-2018 CHANGE | BIKE | TRANSIT | LAST MILE SPEED (MPH) |
|---|---|---|---|---|---|---|---|---|
| 1 (3) | Rome | Italy | 166 (1) | 1% | 1% | | | 11 |
| 2 (2) | Paris | France | 165 (2) | -4% | -1% | | | 10 |
| 3 (1) | London | United Kingdom | 149 (5) | -9% | 1% | | | 10 |
| 4 (5) | Saint Petersburg | Russia | 151 (4) | 3% | 3% | | | 14 |
| 5 (4) | Dublin | Ireland | 154 (3) | -4% | 1% | | | 10 |
| 6 (6) | Moscow | Russia | 128 (9) | -2% | 2% | | | 15 |
| 7 (7) | Brussels | Belgium | 140 (6) | -7% | -5% | | | 9 |
| 8 (9) | Palermo | Italy | 137 (7) | 5% | -4% | | | 8 |
| 9 (8) | Lisboa | Portugal | 136 (8) | -9% | 9% | | | 10 |
| 10 (10) | Turin | Italy | 123 (10) | 1% | 4% | | | 9 |
| 11 (12) | Athens | Greece | 107 (12) | -6% | 12% | | | 14 |
| 12 (19) | Nizhny Novgorod | Russia | 102 (15) | 12% | -11% | | | 12 |
| 13 (11) | Belfast | United Kingdom | 112 (11) | -8% | -6% | | | 11 |
| 14 (20) | Milan | Italy | 98 (16) | 9% | 0% | | | 13 |
| 15 (16) | Lyon | France | 105 (13) | 1% | 4% | | | 10 |
| 16 (13) | Bristol | United Kingdom | 103 (14) | -8% | 8% | | | 13 |
| 17 (14) | Budapest | Hungary | 92 (20) | -6% | 10% | | | 15 |
| 18 (18) | Edinburgh | United Kingdom | 98 (16) | -4% | -6% | | | 10 |
| 19 (15) | Krasnodar | Russia | 94 (18) | -10% | 12% | | | 15 |
| 20 (21) | München | Germany | 87 (22) | -1% | -4% | | | 11 |
| 21 (23) | Barcelona | Spain | 78 (30) | 1% | -6% | | | 12 |
| 22 (17) | Manchester | United Kingdom | 92 (20) | -10% | -4% | | | 14 |
| 23 (29) | Rostov-on-Don | Russia | 84 (24) | 6% | -9% | | | 13 |
| 24 (32) | Lille | Belgium | 93 (19) | 11% | 8% | | | 11 |
| 25 (26) | Samara | Russia | 80 (27) | -2% | -11% | | | 12 |

## The United Kingdom

The U.K. congestion landscape differs significantly from that experienced by U.S. drivers. Most U.K. cities predate the automobile by centuries, and feature denser, less car friendly urban cores as a result. This, coupled with much earlier industrialization, resulted in rail-centric alternatives. The fact Transport for London operates underground lines older than 150 years speaks to a very different history of growth when compared to the U.S. While the U.K. did pursue major roadworks and expansion of motorways in the post-war period, hundreds of years of development is not easily undone, which is reflected in much greater time loss values than in the U.S. and slower last mile travel speeds.

Furthermore, the age of the U.K.'s cities appears in high biking scores. Many of these cities settlement patterns even predate rail, making them well suited to walking and biking. Only London shows high levels of delays due to incidents in the UK. It is likely attributable to its highly complex road network and high congestion levels. On average, drivers in the U.K. lost 115 hours due to congestion in 2019, costing the country £6.9 billion or £894 per driver ($8.9 billion; $1,162 per driver).

### INRIX Top 10 Most Congested Cities in the United Kingdom

| 2019 CONGESTION RANK (2018) | URBAN AREA | HOURS LOST IN CONGESTION | 2018-2019 CHANGE | 2017-2018 CHANGE | INCIDENT IMPACT | COST OF PER DRIVER | COST PER CITY | LAST MILE SPEED (MPH) | BIKE | TRANSIT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 (1) | London | 149 | -9% | 1% | | £1,162 | £4.9B | 10 | | |
| 2 (2) | Belfast | 112 | -8% | -6% | | £874 | £117M | 11 | | |
| 3 (3) | Bristol | 103 | -8% | 8% | | £803 | £207M | 13 | | |
| 4 (4) | Edinburgh | 98 | -4% | -6% | | £764 | £177M | 10 | | |
| 5 (4) | Manchester | 92 | -10% | -4% | | £718 | £176M | 14 | | |
| 6 (8) | Cardiff | 87 | 5% | -5% | | £679 | £109M | 11 | | |
| 7 (7) | Birmingham | 80 | -5% | 6% | | £624 | £325M | 16 | | |
| 8 (8) | Southampton | 79 | -5% | 6% | | £616 | £74M | 13 | | |
| 9 (6) | Nottingham | 78 | -17% | 4% | | £608 | £84M | 12 | | |
| 10 (10) | Hull | 75 | 3% | -9% | | £585 | £90M | 15 | | |

*Average hourly wage per capita, not household, was used in calculating the cost of congestion

### Most Congested Corridors in the United Kingdom

Congestion in London outpaces the rest of the U.K. with the three worst corridors in terms of time lost. The A404/A501 from Edgware Road to Old Street is the most impacted roadway, where drivers lose up to 11 minutes per day on average during peak hours.

#### INRIX Top 5 in London

| RANK | ROAD NAME | FROM | TO | DAILY DELAY (MINUTES) | YEARLY DELAY (HOURS) |
|---|---|---|---|---|---|
| 1 | A404/A501 | Edgware Road | Old Street | 11 | 44 |
| 2 | A4 | Chiswick High Road | Piccadilly Circus | 10 | 40 |
| 3 | M25 | A307 | M40 | 9 | 36 |
| 4 | A2 | New Cross Gate | Vauxhall | 7 | 28 |
| 5 | A202 | A2 | A203 | 6 | 24 |

#### INRIX Top 10 Outside of London

| RANK | CITY | ROAD NAME | FROM | TO | DAILY DELAY (MINUTES) | YEARLY DELAY (HOURS) |
|---|---|---|---|---|---|---|
| 1 | Birmingham | A38 | Northfield | Lancaster Circus | 8 | 32 |
| 2 | Bournemouth | A338 | Hurn Road | St. Paul's Road | 8 | 32 |
| 3 | Edinburgh | A90/A902 | M90 | A901 | 7 | 28 |
| 4 | Leeds | M62 | A1(M) | M621 | 6 | 24 |
| 5 | Birmingham | M5 | M6 | A38 | 6 | 24 |
| 6 | Manchester | A5103 | M60 | Mancunian Way | 6 | 24 |
| 7 | Liverpool | A5047 | M62 | A580 | 6 | 24 |
| 8 | Edinburgh | A702 | A720 | A700 | 5 | 20 |
| 9 | Manchester | A56 | A560 | M60 | 5 | 20 |
| 10 | Manchester | A663 | A627 | A62 | 4 | 16 |

## Germany

Munich, Berlin, and Dusseldorf top the list as the most congested German cities with motorists losing 87, 66, and 50 hours lost to traffic annually. Congestion imposes the greatest costs on Munich's drivers at up to €774 per year. On a national level, Germans lost an average of 46 hours due to congestion in 2019, costing the country €2.8 billion or €408 per driver ($3.1 billion; $412 per driver).

### INRIX Top 10 Most Congested Cities in Germany

| 2019 CONGESTION RANK (2018) | URBAN AREA | HOURS LOST IN CONGESTION | 2018-2019 CHANGE | 2017-2018 CHANGE | INCIDENT IMPACT | COST OF PER DRIVER | COST PER CITY | LAST MILE SPEED (MPH) | BIKE | TRANSIT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 (1) | München | 87 | -1% | -4% | | € 774 | €405M | 11 | | |
| 2 (2) | Berlin | 66 | 0% | -6% | | € 587 | €792M | 13 | | |
| 3 (4) | Dusseldorf | 50 | 11% | -2% | | € 445 | €98M | 17 | | |
| 4 (3) | Hamburg | 48 | -10% | 0% | | € 427 | €280M | 16 | | |
| 5 (4) | Stuttgart | 42 | -7% | -5% | | € 374 | €85M | 18 | | |
| 5 (6) | Nuremberg | 42 | -5% | -4% | | € 374 | €69M | 15 | | |
| 7 (7) | Cologne | 41 | -2% | 5% | | € 365 | €140M | 17 | | |
| 8 (9) | Hanover | 40 | 8% | 6% | | € 356 | €68M | 18 | | |
| 9 (10) | Bremen | 37 | 6% | -8% | | € 329 | €64M | 14 | | |
| 10 (8) | Frankfurt | 36 | -5% | 6% | | € 320 | €86M | 17 | | |

*Average hourly wage per capita, not household, was used in calculating the cost of congestion

### Top 10 Worst German Corridors

Germany exhibits significantly lower time loss on its corridors than the U.S. or the U.K. Berlin exhibits greater delays than other major cities in Germany with the B96 from Tempelhof to Hallesches topping the list at 28 hours lost per year.



### INRIX Top 10 Worst Corridors in Germany

| RANK | CITY | ROAD NAME | FROM | TO | DAILY DELAY (MINUTES) | YEARLY DELAY (HOURS) |
|---|---|---|---|---|---|---|
| 1 | Berlin | B2 | Seeburger Chaussee | Hofjägerallee | 9 | 36 |
| 2 | Berlin | B96 | L76/B96 | Tempelhofer Ufer | 8 | 32 |
| 3 | Berlin | A100 | A113 | Beusselstraße | 7 | 28 |
| 4 | Munich | B2 | Lortzingstraße | Martin-Greif-Straße | 6 | 24 |
| 5 | Munich | B2/B2R | A96 | A9 | 6 | 24 |
| 6 | Hamburg | Luruper Straße/B431/B4 | Rugenbarg | Neuer Kamp | 6 | 24 |
| 7 | Hamburg | B447/B5/Ring 2 | Borsteler Chaussee | Königstraße | 5 | 20 |
| 8 | Munich | Dachauer Straße | Pelkovenstraße | Nymphenburger Straße | 5 | 20 |
| 9 | Stuttgart | B10 | L1204 | Pragstraße | 5 | 20 |
| 10 | Frankfurt | B3/B8 | A66/Kreuz 21 Frankfurt am Main-Miquelallee | Grusonstraße | 4 | 16 |

**NORTH AMERICA**
10210 NE Points Drive
Suite 400
Kirkland
WA 98033
United States

+1 425-284-3800
info@inrix.com

**EMEA**
Station House
Stamford New Road
Altrincham
Cheshire
WA14 1EP
England

+44 161 927 3600
europe@inrix.com