# Ultimate challenge Part 2

1. What would you choose as the key measure of success of this experiment in encouraging driver partners to serve both cities, and why would you choose this metric?

I would measure the number of times a driver cross over the bridge, using some automated license plate info capturing system. This is because the more frequent a driver crosses the bridge, the more cross-city services there are. Since usually there is a weekly cycle in transportation, I would count the total number of bridge crosses for drivers per week.

2. Describe a practical experiment you would design to compare the effectiveness of the

proposed change in relation to the key measure of success. Please provide details on:

1. how you will implement the experiment

There are two groups for comparison. The testing group is when all tolls are subsidized and drivers can cross the bridge for free, and the control group is when there is a fee charged to the driver.

First, I would randomly select a group of 250 drivers from city Gotham and another 250 from Metropolis and track their daily crossings of the bridge for one week that doesn’t have any major holiday. Then, implement the free charge crossing for one week that also has no holidays and track the same drivers’ crossings over the bridge.

b. what statistical test(s) you will conduct to verify the significance of the observation

The collected data can be organized into rows of drivers and columns of total number of bridge crossing at every 12 hour period throughout both the testing week and the control week.

For each day of the week, I would use a t test to determine whether drivers would increase the number of times that they cross the bridge. The null hypothesis is that the difference between the testing and controlling week is greater than zero, and we reject the null if the probability of such occurrence is greater than 0.95.

c. how you would interpret the results and provide recommendations to the city operations team along with any caveats.

If the number of crossings is significantly higher for certain days of the week, make it free to drivers for only those days or those times of the day.

I would hypothesize that the weekends show the largest difference, because people from both cities are equally likely to travel across. During the week, however, there is more likely more traffic in the evening when people are crossing from Metropolis to Gotham for night life activities and then going back home later.