

# Possible Attacks on TruCentive Parking System

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## 1 Attack 1: Reporting Bogus Spots

The first, most basic attack, that we thought of, was contributor abuse. Regardless of if the client is assumed to be secure or not, one could periodically send bogus PA messages to the system to accrue the  $D$  fixed reward for the spot. Ostensibly, one could do this twice a day and collect large amounts of unearned rewards even when  $D$  is small.

Additionally, assuming clients can be spoofed, one could have multiple accounts to disguise this behavior, accumulating invalid, and possibly valid spots, by buying those spots from people in the TruCentive system. Multiple accounts across a geographic region could accumulate large amounts of TruCentive currency.

## 2 Attack 2: Getting A Refund in a Full Refund Market

In the special case in which the system gives full refunds, one can buy a spot, park there, but say that you did not get the spot. You have the spot, and it cost you nothing. Additionally, in theory, if you wait a sufficient amount of time, you can pretend that you have the spot, and sell it without incurring suspicion. Even in a non-full refund market, then you could buy the spot for less than normal.

## 3 Attack 3: Malicious Team of Attackers

For this attack to work,  $D + X > N$ , which can be the case in the example in 4.b of the TruCentive Paper. The same set of spots can be repeatedly bought and sold among the teams of attackers. Then, for each buy and sale of the accounts, each account earns  $D + X - N$ . Assuming this is greater than zero, then each account can earn money.

## 4 More Attacks: Special Cases

Here are some more exotic, time consuming attacks that we thought of.

1. **Permit Parking:** Sell a valid spot in an area or spot which is open, but is a permit-only area (to which you have a permit). Get the car towed, park there again, and then sell the spot over and over again. In theory, one could even make enough money at scale to buy ones own tow truck to expedite the process.
2. **Metered Lot:** If one owns a metered lot, then they can ‘sell’ the spaces on TruCentive, then charge them again for the spot via the meter.