

We collect and study over **1 million** phone calls to uncover at least **114 robocalling campaigns** that are operational in the wild.

Who's Calling You?

A Study of Robocalls in Modern Telephone Networks

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INTRODUCTION

- Automated phone calls, or **Robocalls**, are a menace with no solution in sight
- We collect data from the real-world telephone network to characterize robocalls
- Our findings highlight the need for stronger and more robust techniques to combat robocalls in modern telephone networks

METHODOLOGY

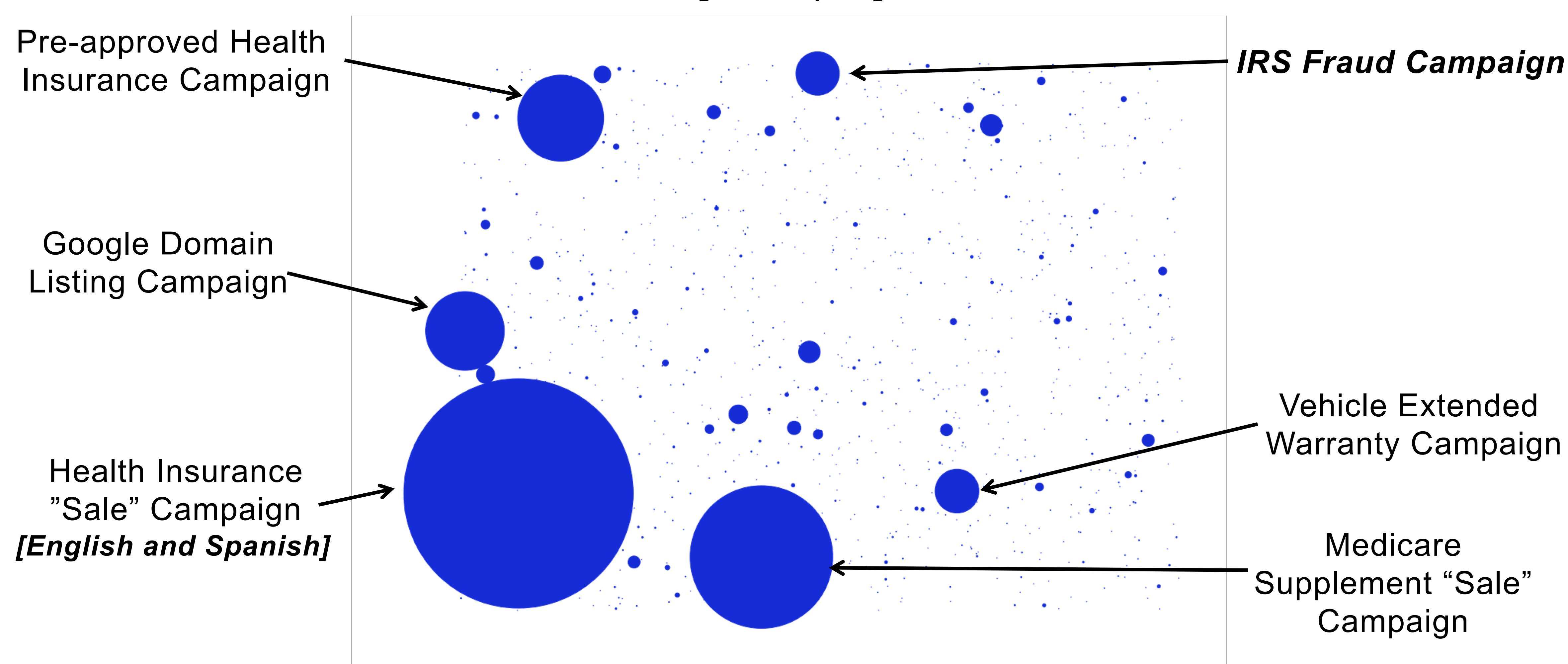
- Using 66,000 inbound telephone lines, we deploy the largest academic telephony honeypot
- We systematically collect call signaling data, Call Detail Records (CDR) and call audio
- We apply robust audio fingerprinting techniques for robocall campaign identification and clustering
- The approach of audio fingerprinting is immune to caller ID spoofing and limitations of phone call audio transcription

RESULTS

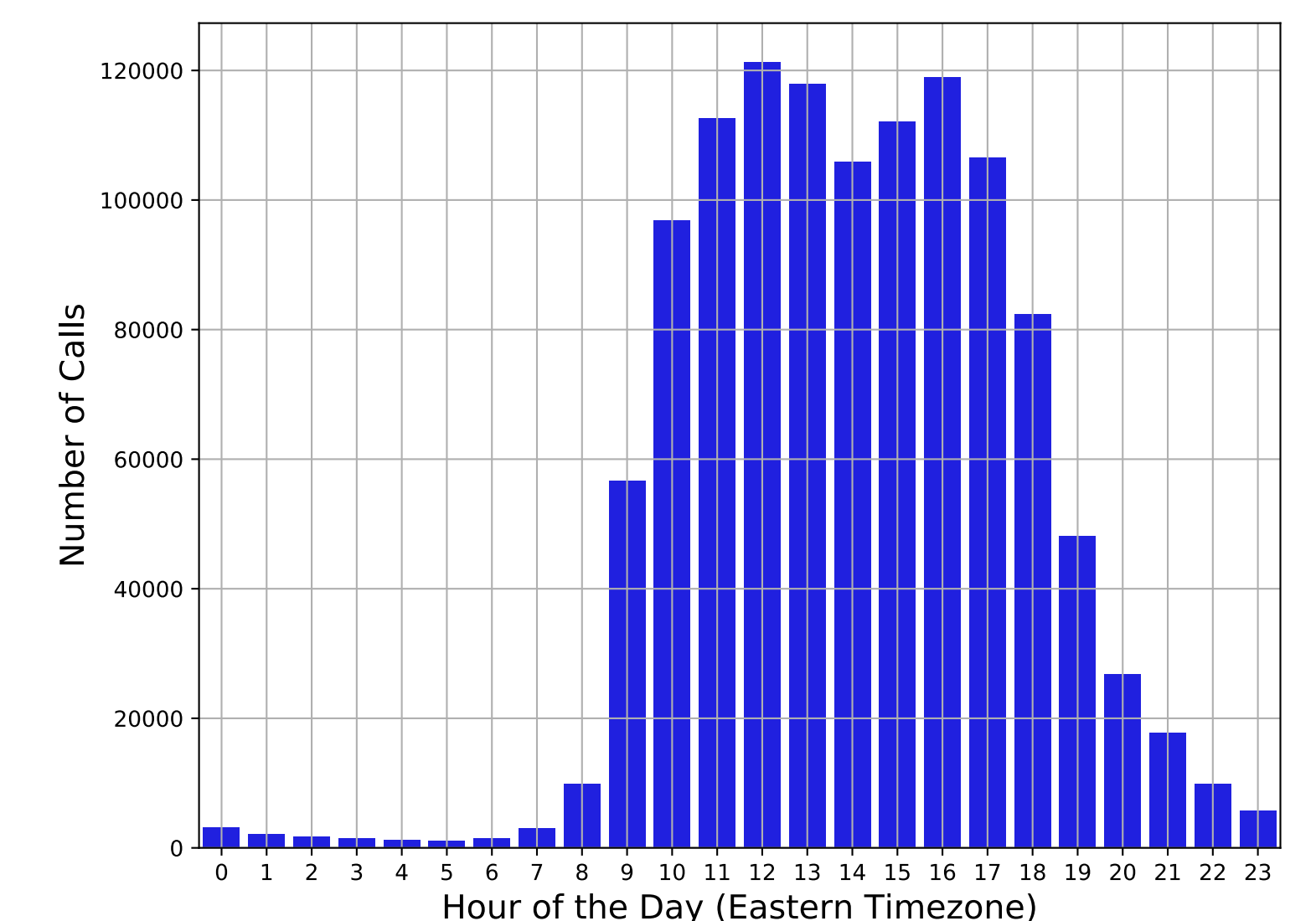
- We identify over 114 robocalling campaigns that are currently operational
- Our approach identifies campaigns operating in different languages (English, Spanish, Mandarin)
- We uncover **Storms** in telephone networks, where bursts of calls are made to a telephone number from different sources in a short span of time

Number of Calls Received	1,165,000 +
Number of Calls Recorded	40,500 +
Duration of Study	7.5 Months
Number of inbound telephone lines	66,000

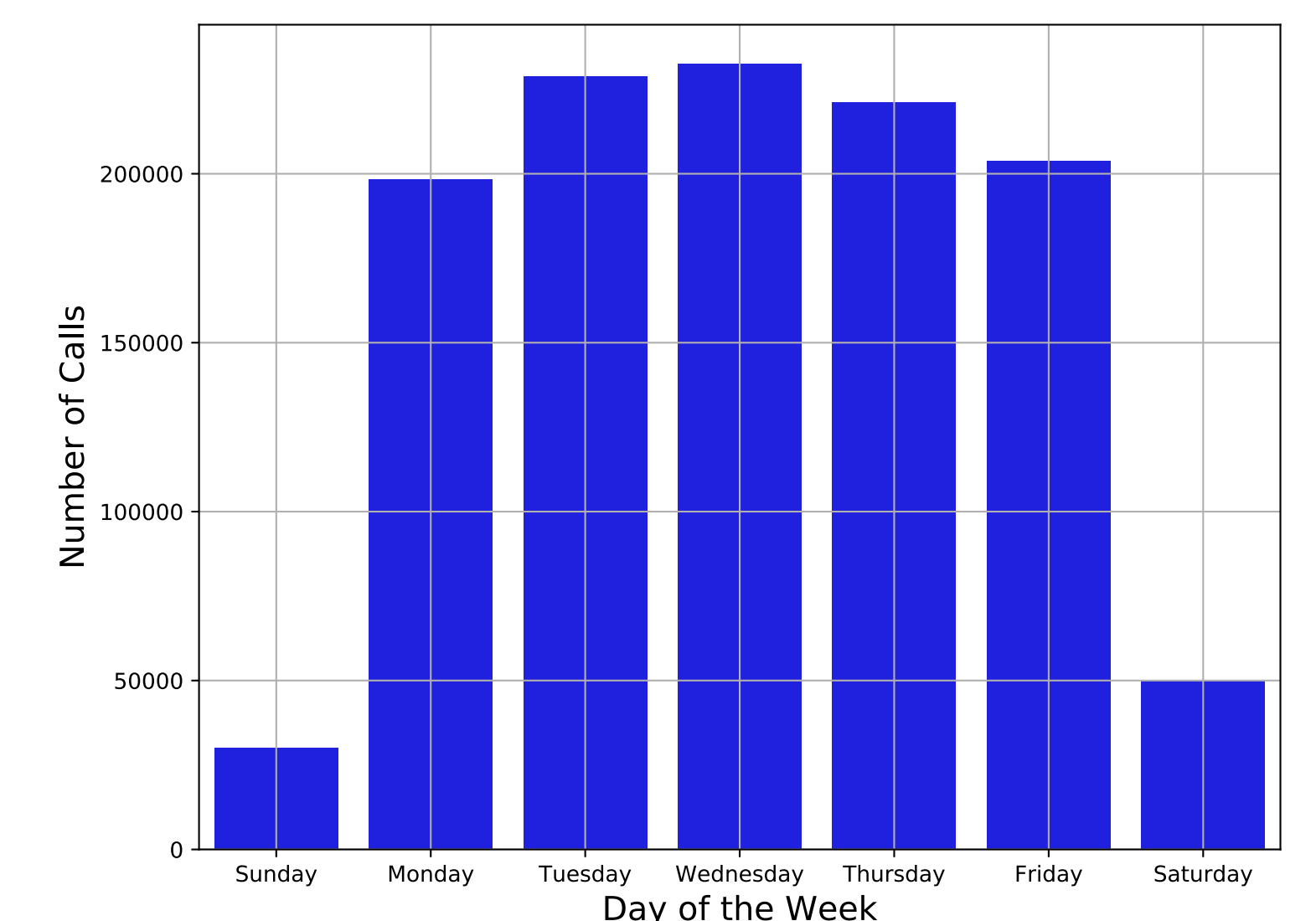
Robocalling Campaign Clusters



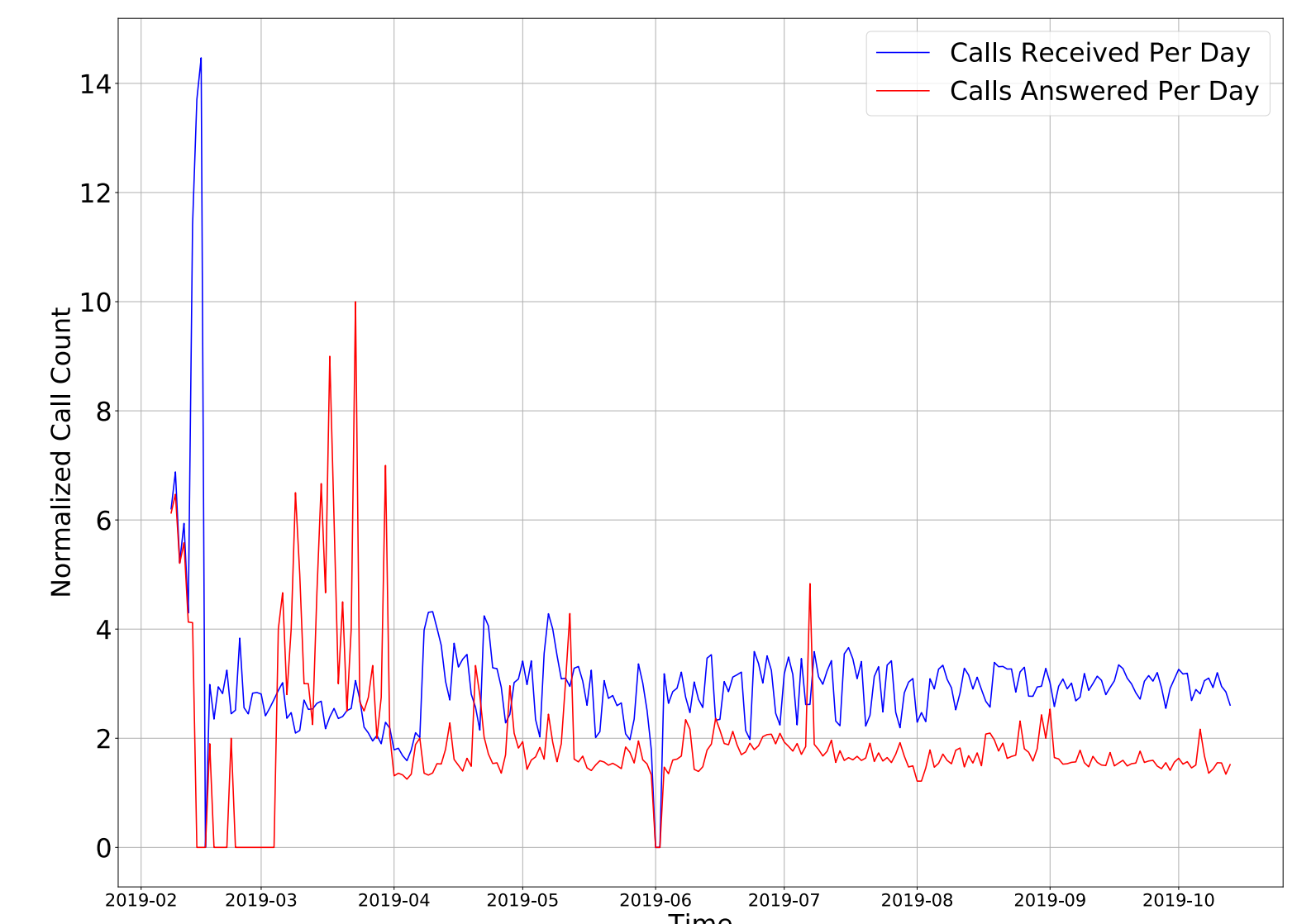
Robocalls are more frequent during working hours



Robocalls are more frequent during weekdays



Call Volume Normalized by Number of Active Inbound Phone Lines



Distribution of Storms Observed Over Time

