12 November 2020

# EDISON ANALYSIS GOES DARK

Fundamental Analysis Errors Lead to Widespread Confusion

Michael Nieminen

## EXECUTIVE SUMMARY

The claim circulated on social media that 220,883 votes in Pennsylvania were switched from Biden to Trump was the result of an erroneous analysis of time series display data used by NYTimes and other media companies to update real-time dashboards on election night. Running the same analysis from Biden's perspective finds that 120,834 votes were switched from Biden to Trump in Florida. Attempts to fix limitations in the analysis produced even more confusing results, such as suggesting that vote switching also occurred to the benefit of third-party presidential candidates. The analysis method is fundamentally flawed.

The Edison time series data used by the media companies is indeed rife with errors and corrections, but these are more likely the result of manual entry of published state data into a central system prior to publishing data to media companies than due to underlying problems with vote tabulations at the state- or precinct-level. **The Edison time series data cannot possibly be valid for an analysis of vote count integrity**.

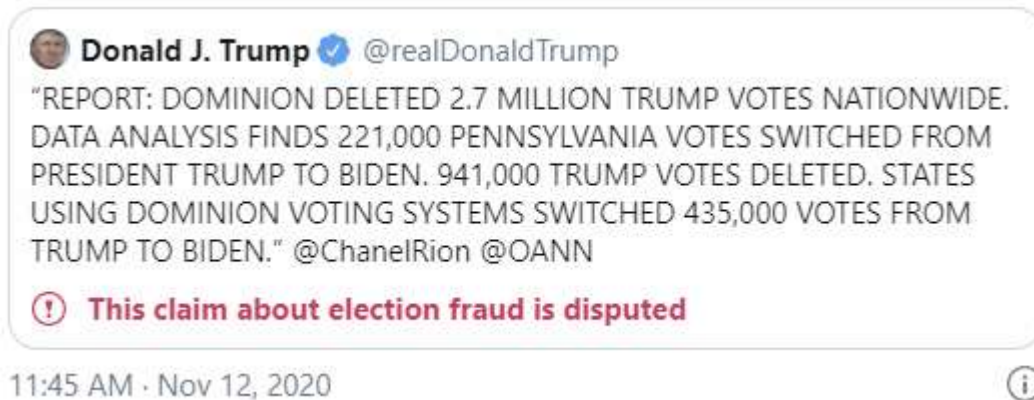There may be problems in some voting systems, but they cannot be found this way.

## SHORT HISTORY

On 10 Nov 2020, "TrumanBlack" posted an analysis[1] of vote tabulation data performed by "PedeInspector" claiming that 220,883 votes in Pennsylvania were switched from Biden to Trump, among other findings in other states. The analysis looked at a time series of vote totals for the two main presidential candidates apparently originating from Edison Research. This time series data is a record of vote totals published by New York Times and other media outlets as they disseminated results by state on Election Day and thereafter.

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[1] https://thedonald.win/p/11Q8O2wesk/happening-calling-every-pede-to-/

Later the same day, The Gateway Pundit picked up this story and published it.[2] It was widely circulated on social media. On 11 Nov 2020, Mick West identified several flaws with the original analysis.[3] Not being aware about his analysis, I started my own review.

On 12 Nov 2020, President Trump tweeted the story's main claims.



Donald J. Trump ✔ @realDonaldTrump

"REPORT: DOMINION DELETED 2.7 MILLION TRUMP VOTES NATIONWIDE. DATA ANALYSIS FINDS 221,000 PENNSYLVANIA VOTES SWITCHED FROM PRESIDENT TRUMP TO BIDEN. 941,000 TRUMP VOTES DELETED. STATES USING DOMINION VOTING SYSTEMS SWITCHED 435,000 VOTES FROM TRUMP TO BIDEN." @ChanelRion @OANN

⚠ **This claim about election fraud is disputed**

11:45 AM · Nov 12, 2020

My review of the program written by PedeInspector revealed several flaws, and I emailed Jim Hoft at The Gateway Pundit on 12 Nov 2020 to note that these claims were faulty and conclusions drawn from them were incorrect. This report explains why they are incorrect and proposes a possible explanation for the anomalies in the source data.

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[2] https://www.thegatewaypundit.com/2020/11/breaking-exclusive-analysis-election-night-data-states-shows-millions-votes-either-switched-president-trump-biden-lost/
[3] https://www.metabunk.org/threads/claims-of-irregularities-in-scraped-election-data.11450/

## SOURCE DATA

The time series data used by PedeInspector is available for all 50 states from the NYTimes website.[4] Each data file is in JSON format and consists of a sequence of snapshots in time of the **total votes cast** and the **percentage cast for each candidate**. Every time new vote tallies came in from a state, a new record was published, and this data was used to update dashboards displayed on media websites and on TV screens of the major networks.

Two sequential records from the Pennsylvania data are shown below.

```
{
    "vote_shares": {
        "bidenj": 0.587,
        "trumpd": 0.407
    },
    "votes": 436908,
    "eevp": 6,
    "eevp_source": "edison",
    "timestamp": "2020-11-04T01:31:11Z"
},
{
    "vote_shares": {
        "bidenj": 0.604,
        "trumpd": 0.39
    },
    "votes": 476287,
    "eevp": 7,
    "eevp_source": "edison",
    "timestamp": "2020-11-04T01:32:56Z"
},
```

Each record has a timestamp (UTC time), a total vote count, and a fractional share of the vote for each candidate. The data source is identified as "edison" which is understood to refer to Edison Research.[5]

Using the total votes and the fraction of votes, it is theoretically easy to calculate how many votes each candidate had at each moment in time as election night progressed.

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[4] https://static01.nyt.com/elections-assets/2020/data/api/2020-11-03/state-page/
This must be followed by the correct JSON filename; see reference 1 or 3 for download instructions.
[5] https://www.edisonresearch.com/election-polling/

## ORIGINAL APPROACH

The original program published by PedeInspector had a simple premise. The idea was to compare the votes each candidate had at the time of each update, with the votes he had at the previous update, and to determine if the change in votes was sensible. It seemed reasonable to think that the vote count should never decrease. Any *reduction* in Trump's vote count, or in the total vote count, was understood as a sign of **fraudulently deleted votes**. A simultaneous reduction in votes for Trump while Biden's votes increased was understood as a sign that votes were **switched from Trump to Biden**.

Even if the source data were 100% valid for this type of analysis (more on that later), this approach does not consider the following possibilities:

- Votes could be subtracted from Trump without being added to Biden, even if Biden's votes increase at the same time
- Votes could be subtracted from Biden too and switched to Trump
- Votes could be subtracted from either candidate and added to third-party candidates who are not listed but are included in the total vote count
- Votes that are subtracted from a candidate in one update can return later; they are not necessarily permanently "lost"
- Votes could simply be fraudulently *added* to a candidate (seems easier!)

To his credit, PedeInspector did note that the reliability of the source data set is not known. "Everyone can interpret these numbers as they wish, for now, the only proof we have that the data used to reach this conclusion is real, is that the Antrim county glitch shows up in the data. We might be able to confirm that it is 100% real once Georgia completes their hand recount."

However, when posting the findings, TrumanBlack started his post with the statement, "EVERY THING YOU'RE ABOUT TO READ IS VERIFIED." The Gateway Pundit included a disclaimer: "The author claims that his work has been verified but we have not verified the results so we currently are labeling his results 'unaudited.'" They nevertheless proceeded to publish: "BREAKING EXCLUSIVE: Analysis of Election Night Data from All States Shows MILLIONS OF VOTES Either Switched from President Trump to Biden or Were Lost — Using Dominion and Other Systems."[6]

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[6] https://www.thegatewaypundit.com/2020/11/breaking-exclusive-analysis-election-night-data-states-shows-millions-votes-either-switched-president-trump-biden-lost/

## RE-ANALYSIS OF THE DATA

### What the Original Analysis Missed

Focusing only on two states, the original claims were:

- Pennsylvania
    - Votes switched from Trump to Biden: 220,883
    - Lost Votes: 941,248
- Florida
    - Votes switched from Trump to Biden: 21,422
    - Lost Votes: 456

The original Python program (see appendix) looked for changes in the vote counts where Trump votes decreased AND Biden votes simultaneously increased.

```
IF (trumpvotes_now < trumpvotes_before) AND (bidenvotes_now >
bidenvotes_before): THEN VOTES WERE SWITCHED FROM TRUMP
```

It also assumed that every time votes decreased, they disappeared forever. It summed up all subtractions to determine how many total votes were "lost" in each state, and these figures were then widely reproduced on social media.

The biggest miss was that the reverse case was not considered. It should immediately have been obvious to look for cases where Biden votes decreased AND Trump votes simultaneously increased.

```
IF (bidenvotes_now < bidenvotes_before) AND (trumpvotes_now >
trumpvotes_before): THEN VOTES WERE SWITCHED FROM BIDEN!!
```

Running this comparison (see updated program in appendix) reveals the following:

- Pennsylvania
    - Total votes presumed switched from Trump to Biden: 220,884
    - Total votes presumed switched from Biden to Trump: **24,723**
- Florida
    - Total votes presumed switched from Trump to Biden: 21,423
    - Total votes presumed switched from Biden to Trump: **120,834**

Clearly, this data anomaly is at work in both directions and does not hurt only Trump! **If this anomaly helped Biden win PA, then it helped Trump win FL**.

Furthermore, as West noted in his critical analysis cited earlier, if one believes that a decrease in votes should never happen, then one should add up all these decreases: "But what if we add up ANY decline? After all a decrease in your votes is an anomaly, it does not really matter if it happens simultaneously with a rise in your opponent's votes. If we add up ALL the declines, we have: Trump Lost = -408547 and Biden Lost = -637917. **So adjustment down hurt Biden more than Trump**."

These facts immediately require the honest observer to question the whole premise.

## Revised Analysis

PedeInspector did release a new version of the program on 12 Nov 2020 to address a number of limitations in the original. This version considered votes switching from Biden to Trump and also considered third-party candidates, but the other fundamental premises were kept intact, namely that all reductions in votes were permanently lost and that the source data was suitable for this type of analysis.

The updated results for PA and FL are shown below.[7] In PedeInspector's own words: "First, we check whether when Trump lost votes, Biden gained that amount of votes, then we do the same for Trump to 3rd party, and so on when checking Biden and 3rd party for switches, afterwards, below the /////// lines, we switch the checking around, it basically means that it is certain that the candidates lost that amount of votes in total, while other candidates gained those votes, but we can't be sure which candidate gained which votes, so I'm showing you both possibilities."

- Pennsylvania
  - Trump to Biden 47,522
  - Trump to 3rd 36,578
  - Biden to Trump 6,864
  - Biden to 3rd 13,993
  - 3rd to Biden 202,664
  - 3rd to Trump 6,917
  - ////////////////
  - Trump to 3rd 50,799
  - Trump to Biden 33,302
  - Biden to 3rd 20,858
  - Biden to Trump 0
  - 3rd to Trump 176,623
  - 3rd to Biden 32,858
- Florida
  - Trump to Biden 7,197
  - Trump to 3rd 14,225
  - Biden to Trump 26,614
  - Biden to 3rd 79,770
  - 3rd to Biden 156,936
  - 3rd to Trump 39,439
  - ///////////////
  - Trump to 3rd 14,615
  - Trump to Biden 6,807
  - Biden to 3rd 98,158

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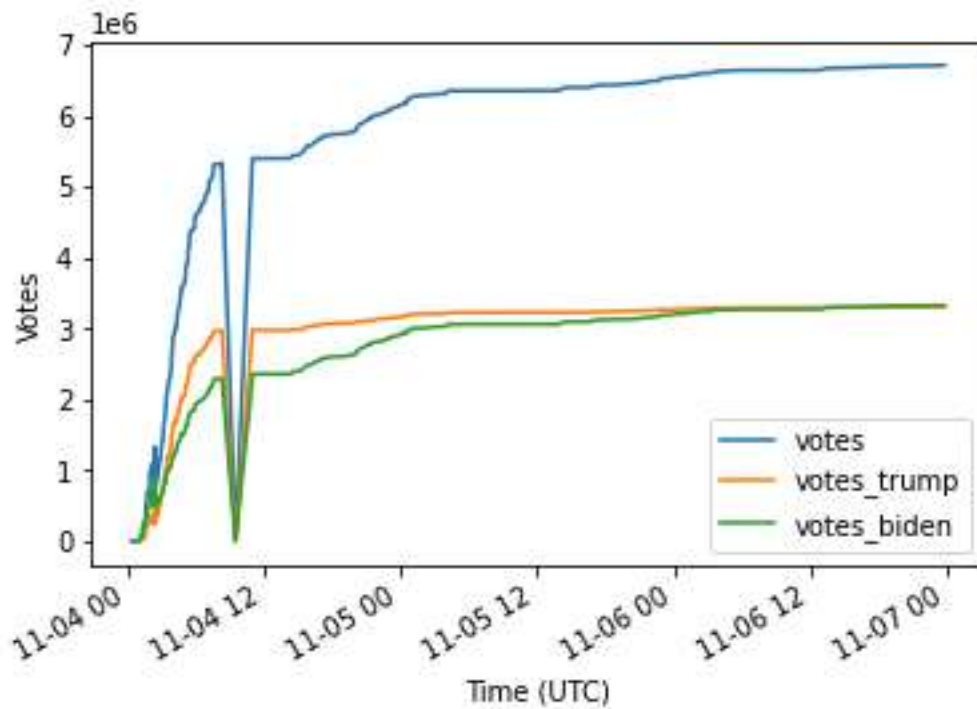[7] https://thedonald.win/p/11Q8XQHhVH/updated-glitch-list/

o   Biden to Trump 8,226
o   3rd to Trump 150,098
o   3rd to Biden 46,278

That became rather complicated quickly. When the data from the other 48 states is considered, following these analysis assumptions we can hardly make heads or tails of this messy result. The ballot counting machines, assumed to be the true source of the Edison data, appear to be random number generators. As West noted, such a magnitude of vote changes all over the place would quickly be uncovered during recounts and vote certification. This outcome, again, should give the honest observer some pause.
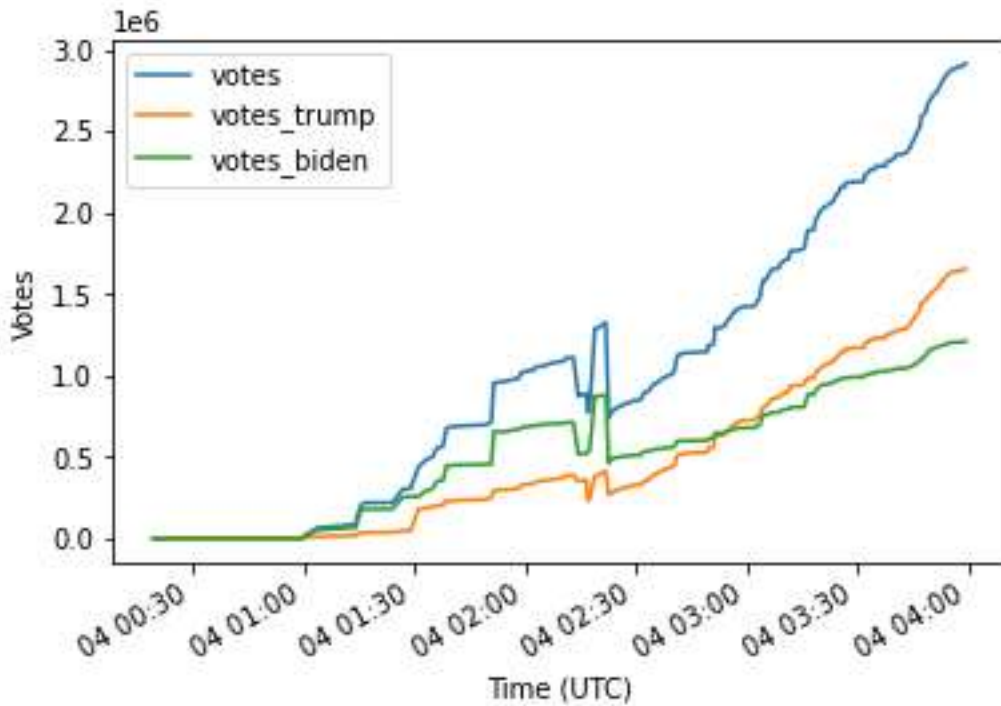
## Reconsidering the Source Data
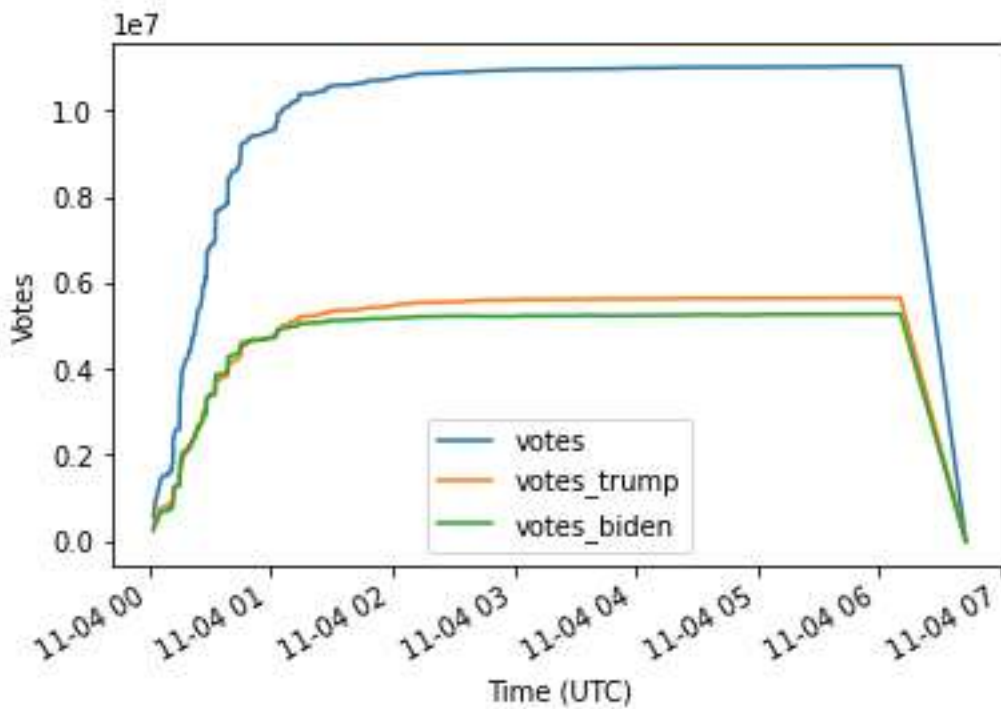
The following chart shows the time series data for PA.



The big dip in the data clearly represents a data anomaly; this dip is not counted in the "lost votes" calculations, which is good because all votes until then are temporarily lost. But the presence of this dip and the return approximately to the same values strongly suggests that decreases in vote counts in this dataset do not indicate a loss in underlying vote counts provided by each state.

Zooming in on the first part of the plot (below) shows some erroneous ups and downs in data in the time after polls first opened. These subtractions **are** included in the "lost votes" calculations, including a dip of 127,916 Trump votes. This is not real data as reported by polling stations. Furthermore, the general sloppiness of this dataset **suggests it is solely intended for display purposes**.

The following chart shows the time series data for FL. The updates to this data stopped already on 4 Nov 2020. It seems that once a state was called for a candidate and/or most of the votes were counted, the effort to update the dashboards stopped, and this makes sense, even though counting by state officials continued.

The anomalies in these datasets raise the question: What is going on behind the scenes at Edison Research? How could election data being streamed to media companies be so rife with errors?

Let's consider where the data originates: with each state. Every state has its own voting system and its own implementation, with different servers housing their published data. My hunch is that Edison decided it would be too much effort to build connections to each state's vote reporting systems only for a few days of publishing effort. If I'm right, Edison would have worked around this by hiring clerks to key in data manually from all the state systems as it was received, into Edison's central system. In other words, **the vote count and vote percentage for each candidate were likely manually entered by staff** on election night and the days following, not automatically pulled from any system. The central system then pushed updates to media companies, and those updates are reflected in the obtained JSON files.

Supporting this theory is the fact that the time duration between updates is not uniform. During the active phase of election night, some updates happened in as little as 30 seconds, while others were several minutes apart. Each dataset would be stamped with a date and time when the clerk saves the data, but *that does not mean all data contained within that dataset was captured at the same moment in time*.

**Imagine, perhaps, a roomful of clerks at computers copying numbers from monitors on a wall that were showing the vote totals and other metrics for each state**. The numbers on the monitors are constantly changing as data in the state system is updated. The clerks are looking up at the monitors and then typing on their computers. They copy a percentage for Biden. Time passes. They copy a percentage for Trump. Time passes. They copy the vote total and press Enter. By the time they have finished copied all the numbers, *the dataset is not internally consistent anymore*. The percentages and/or vote counts were changing as they were copying them. The vote counts they entered do not match exactly in time with the percentages they entered, and so on. Furthermore, sometimes they may have copied a number from the wrong monitor altogether, leading to major errors such as those seen in the early part of the PA dataset, which had to be corrected with subsequent entries. **Manual, asynchronous data copying would explain why the Edison dataset is not internally consistent**.

These errors in the data, likely due to transcription errors by staff, not computer "glitches," led to the embarrassing scenes on CNN and other networks showing vote counts decreasing and switching. The media companies can decide whether this was the service they ordered. For our purposes here, it is enough to realize that **the Edison time series data cannot possibly be valid for an analysis of vote count integrity**.

Those dissatisfied with this conclusion can dig further. It's a long way to China.

# APPENDIX A: PYTHON PROGRAMS

```
import json
# This requires installing the modules first
import matplotlib.pyplot as plt # run 'pip install matplotlib.pyplot' at OS command
prompt
import pandas as pd # run 'pip install pandas' at OS command prompt


####################################################
# These are the original functions by TrumanBlack #
####################################################

def findfraud(NAME):
    with open(NAME + '.json', encoding="utf8") as f:
        x = json.load(f)
    TotalVotesLost = 0
    for i in range(len(x["data"]["races"][0]["timeseries"])):
        if i != 0 and x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["trumpd"] <
x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["trumpd"]:
            if x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["bidenj"] >
x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["bidenj"]:
                print ("Index : " + str(i) + " Past Index : " + str(i-1))
                print (x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["trumpd"] -
x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["trumpd"])
                TotalVotesLost += x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["trumpd"] -
x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["trumpd"]
    print (str(str(TotalVotesLost)  + " Flo"))


def findfraud2(NAME):
    with open(NAME + '.json', encoding="utf8") as f:
        x = json.load(f)
    TotalVotesLost = 0
    for i in range(len(x["data"]["races"][0]["timeseries"])):
        if i != 0 and x["data"]["races"][0]["timeseries"][i]["votes"] <
x["data"]["races"][0]["timeseries"][i-1]["votes"]:
            TotalVotesLost += x["data"]["races"][0]["timeseries"][i]["votes"] -
x["data"]["races"][0]["timeseries"][i-1]["votes"]
    print (TotalVotesLost)


##################################
# These are new functions by MN #
##################################

# The original function is supposed to find votes "switched" from Biden to Trump between
successive updates from Edison
# I reformatted the code to make it easier to follow the logic and output, but the
results are identical
# I also mirrored the calculation to show votes "switched" the other way: from Trump to
Biden
def findfraud3(NAME):
    with open(NAME + '.json', encoding="utf8") as f:
        x = json.load(f)
    TotalVotesSwitchedFromTrump = 0
    TotalVotesSwitchedFromBiden = 0
    # Go through the published time series of updates sequentially
    for i in range(len(x["data"]["races"][0]["timeseries"])):
        # Extract data for current update and previous update
        time_before = x["data"]["races"][0]["timeseries"][i-1]["timestamp"]
        time_now = x["data"]["races"][0]["timeseries"][i]["timestamp"]
        votes_before = x["data"]["races"][0]["timeseries"][i-1]["votes"]
        votes_now = x["data"]["races"][0]["timeseries"][i]["votes"]
        trumpvotes_before = round( x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["trumpd"] )
        trumpvotes_now = round( x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["trumpd"] )
```

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```python
        bidenvotes_before = round( x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["bidenj"] )
        bidenvotes_now = round( x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["bidenj"] )

        # Look for cases where Trump votes decreased from previous update AND Biden votes
went up.
        # The presumption is that all votes lost by Trump "switched" to Biden.
        # NB!!! THIS LOGIC IS FAULTY!!!
        if i != 0 and trumpvotes_now < trumpvotes_before:
            if bidenvotes_now > bidenvotes_before:
                print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_before),trumpvotes_before,trumpvotes_before/votes_before*100,
bidenvotes_before,bidenvotes_before/votes_before*100))
                print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_now),trumpvotes_now,trumpvotes_now/votes_now*100,bidenvotes_n
ow,bidenvotes_now/votes_now*100))
                print (' Votes presumed lost by Trump: {:,}'.format(trumpvotes_now -
trumpvotes_before))
                TotalVotesSwitchedFromTrump += trumpvotes_now - trumpvotes_before
        # Now look for cases where Biden votes decreased from previous update AND Trump
votes went up.
        if i != 0 and bidenvotes_now < bidenvotes_before:
            if trumpvotes_now > trumpvotes_before:
                print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_before),trumpvotes_before,trumpvotes_before/votes_before*100,
bidenvotes_before,bidenvotes_before/votes_before*100))
                print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_now),trumpvotes_now,trumpvotes_now/votes_now*100,bidenvotes_n
ow,bidenvotes_now/votes_now*100))
                print (' Votes presumed lost by Biden: {:,}'.format(bidenvotes_now -
bidenvotes_before))
                TotalVotesSwitchedFromBiden += bidenvotes_now - bidenvotes_before
    print ('Total votes presumed switched from Trump to Biden:
{:,}'.format(TotalVotesSwitchedFromTrump))
    print ('Total votes presumed switched from Biden to Trump:
{:,}'.format(TotalVotesSwitchedFromBiden))

# This function plots the time series of votes for either candidate for the specified
state
def plotvotesfor(NAME):
    with open(NAME + '.json', encoding="utf8") as f:
        x = json.load(f)

    data = pd.json_normalize(x["data"]["races"][0]["timeseries"])

    data["timestamp"] = pd.to_datetime(data["timestamp"])
    data.index = data["timestamp"] # Will put timestamp on the x-axis of plot
    data["votes_trump"] = data["votes"] * data["vote_shares.trumpd"]
    data["votes_biden"] = data["votes"] * data["vote_shares.bidenj"]

    #data.loc[:, ['votes', 'votes_trump', 'votes_biden']].plot(kind = 'line')
    data.loc['2020-11-06', ['votes', 'votes_trump', 'votes_biden']].plot(kind = 'line')
    plt.xlabel("Time (UTC)")
    plt.ylabel("Votes")
    plt.show()

    return data

# This function looks for cases where the vote count for either Trump or Biden decreased
from one Edison record to the next.
# This seems unusual, but it does not prove fraud.
# The results show that both candidates lost plenty of votes as measured in this way, but
Biden lost more in PA.
def findanomalies_mn(NAME):
    with open(NAME + '.json', encoding="utf8") as f:
        x = json.load(f)
    TotalVotesLostbyTrump = 0
    TotalVotesLostbyBiden = 0
    # Go through the published time series of updates sequentially
    for i in range(len(x["data"]["races"][0]["timeseries"])):
        # Extract data for current update and previous update
        time_before = x["data"]["races"][0]["timeseries"][i-1]["timestamp"]
```

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```
        time_now = x["data"]["races"][0]["timeseries"][i]["timestamp"]
        votes_before = x["data"]["races"][0]["timeseries"][i-1]["votes"]
        votes_now = x["data"]["races"][0]["timeseries"][i]["votes"]
        trumpvotes_before = round( x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["trumpd"] )
        trumpvotes_now = round( x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["trumpd"] )
        bidenvotes_before = round( x["data"]["races"][0]["timeseries"][i-1]["votes"] *
x["data"]["races"][0]["timeseries"][i-1]["vote_shares"]["bidenj"] )
        bidenvotes_now = round( x["data"]["races"][0]["timeseries"][i]["votes"] *
x["data"]["races"][0]["timeseries"][i]["vote_shares"]["bidenj"] )

        # Look for cases where Trump votes decreased from previous update.
        if i != 0 and trumpvotes_now < trumpvotes_before and votes_before > 0 and
votes_now > 0:
            print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_before),trumpvotes_before,trumpvotes_before/votes_before*100,
bidenvotes_before,bidenvotes_before/votes_before*100))
            print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_now),trumpvotes_now,trumpvotes_now/votes_now*100,bidenvotes_n
ow,bidenvotes_now/votes_now*100))
            print (' Votes lost by Trump: {:,}'.format(trumpvotes_now -
trumpvotes_before))
            TotalVotesLostbyTrump += trumpvotes_now - trumpvotes_before
        # Look for cases where Biden votes decreased from previous update.
        if i != 0 and bidenvotes_now < bidenvotes_before and votes_before > 0 and
votes_now > 0:
            print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_before),trumpvotes_before,trumpvotes_before/votes_before*100,
bidenvotes_before,bidenvotes_before/votes_before*100))
            print ('At {}, Trump = {:,} ({:.1f}%) and Biden = {:,}
({:.1f}%).'.format(str(time_now),trumpvotes_now,trumpvotes_now/votes_now*100,bidenvotes_n
ow,bidenvotes_now/votes_now*100))
            print (' Votes lost by Biden: {:,}'.format(bidenvotes_now -
bidenvotes_before))
            TotalVotesLostbyBiden += bidenvotes_now - bidenvotes_before
    print ('Total votes presumed lost by Trump: {:,}'.format(TotalVotesLostbyTrump))
    print ('Total votes presumed lost by Biden: {:,}'.format(TotalVotesLostbyBiden))
```

## APPENDIX B: RESULTS FOR PA AND FL

The following results are obtained with the findfraud_mn() function.

```
findfraud3('pennsylvania')
At 2020-11-04T01:17:19Z, Trump = 37,039 (16.9%) and Biden = 180,154 (82.2%).
At 2020-11-04T01:24:10Z, Trump = 37,055 (16.9%) and Biden = 180,011 (82.1%).
 Votes presumed lost by Biden: -143
At 2020-11-04T01:29:03Z, Trump = 47,567 (15.5%) and Biden = 256,553 (83.6%).
At 2020-11-04T01:31:11Z, Trump = 177,822 (40.7%) and Biden = 256,465 (58.7%).
 Votes presumed lost by Biden: -88
At 2020-11-04T02:16:43Z, Trump = 360,896 (40.6%) and Biden = 520,900 (58.6%).
At 2020-11-04T02:17:03Z, Trump = 232,980 (30.1%) and Biden = 533,300 (68.9%).
 Votes presumed lost by Trump: -127,916
At 2020-11-04T02:38:07Z, Trump = 425,367 (42.8%) and Biden = 556,555 (56.0%).
At 2020-11-04T02:38:19Z, Trump = 425,435 (42.8%) and Biden = 555,649 (55.9%).
 Votes presumed lost by Biden: -906
At 2020-11-04T02:47:35Z, Trump = 527,082 (46.1%) and Biden = 601,399 (52.6%).
At 2020-11-04T02:47:57Z, Trump = 528,051 (46.1%) and Biden = 601,359 (52.5%).
 Votes presumed lost by Biden: -40
At 2020-11-04T02:55:22Z, Trump = 668,911 (49.6%) and Biden = 662,168 (49.1%).
At 2020-11-04T02:55:34Z, Trump = 671,093 (49.7%) and Biden = 661,641 (49.0%).
 Votes presumed lost by Biden: -527
At 2020-11-04T03:12:51Z, Trump = 937,785 (53.1%) and Biden = 805,330 (45.6%).
At 2020-11-04T03:13:18Z, Trump = 937,898 (53.1%) and Biden = 803,660 (45.5%).
 Votes presumed lost by Biden: -1,670
At 2020-11-04T03:29:30Z, Trump = 1,168,854 (53.4%) and Biden = 991,556 (45.3%).
At 2020-11-04T03:31:51Z, Trump = 1,170,935 (53.4%) and Biden = 991,129 (45.2%).
 Votes presumed lost by Biden: -427
At 2020-11-04T03:33:51Z, Trump = 1,219,608 (53.9%) and Biden = 1,013,700 (44.8%).
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At 2020-11-04T03:34:13Z, Trump = 1,221,405 (53.9%) and Biden = 1,012,928 (44.7%).
 Votes presumed lost by Biden: -772
At 2020-11-04T03:36:12Z, Trump = 1,232,133 (53.9%) and Biden = 1,024,111 (44.8%).
At 2020-11-04T03:37:38Z, Trump = 1,229,992 (53.8%) and Biden = 1,024,231 (44.8%).
 Votes presumed lost by Trump: -2,141
At 2020-11-04T03:40:27Z, Trump = 1,278,284 (54.3%) and Biden = 1,042,873 (44.3%).
At 2020-11-04T03:42:23Z, Trump = 1,283,097 (54.4%) and Biden = 1,042,516 (44.2%).
 Votes presumed lost by Biden: -357
At 2020-11-04T03:59:27Z, Trump = 1,655,410 (56.8%) and Biden = 1,212,413 (41.6%).
At 2020-11-04T04:00:36Z, Trump = 1,656,175 (56.8%) and Biden = 1,210,057 (41.5%).
 Votes presumed lost by Biden: -2,356
At 2020-11-04T04:07:43Z, Trump = 1,689,209 (56.6%) and Biden = 1,253,477 (42.0%).
At 2020-11-04T04:08:51Z, Trump = 1,671,332 (56.0%) and Biden = 1,271,406 (42.6%).
 Votes presumed lost by Trump: -17,877
At 2020-11-04T04:11:10Z, Trump = 1,688,506 (56.1%) and Biden = 1,279,171 (42.5%).
At 2020-11-04T04:12:11Z, Trump = 1,693,503 (56.2%) and Biden = 1,277,661 (42.4%).
 Votes presumed lost by Biden: -1,510
At 2020-11-04T04:41:32Z, Trump = 2,019,991 (56.4%) and Biden = 1,511,412 (42.2%).
At 2020-11-04T04:41:57Z, Trump = 2,021,054 (56.4%) and Biden = 1,508,624 (42.1%).
 Votes presumed lost by Biden: -2,788
At 2020-11-04T05:52:34Z, Trump = 2,592,227 (56.8%) and Biden = 1,912,224 (41.9%).
At 2020-11-04T05:53:08Z, Trump = 2,591,374 (56.6%) and Biden = 1,922,928 (42.0%).
 Votes presumed lost by Trump: -853
At 2020-11-04T07:06:51Z, Trump = 2,855,387 (56.2%) and Biden = 2,159,323 (42.5%).
At 2020-11-04T07:08:49Z, Trump = 2,857,822 (56.2%) and Biden = 2,156,079 (42.4%).
 Votes presumed lost by Biden: -3,244
At 2020-11-04T10:54:40Z, Trump = 2,971,368 (55.1%) and Biden = 2,351,209 (43.6%).
At 2020-11-04T14:16:51Z, Trump = 2,968,494 (55.0%) and Biden = 2,353,206 (43.6%).
 Votes presumed lost by Trump: -2,874
At 2020-11-04T14:54:50Z, Trump = 2,979,427 (54.8%) and Biden = 2,386,804 (43.9%).
At 2020-11-04T15:00:52Z, Trump = 2,976,329 (54.7%) and Biden = 2,388,681 (43.9%).
 Votes presumed lost by Trump: -3,098
At 2020-11-04T19:04:59Z, Trump = 3,067,023 (53.4%) and Biden = 2,601,801 (45.3%).
At 2020-11-04T19:16:54Z, Trump = 3,066,905 (53.3%) and Biden = 2,612,336 (45.4%).
 Votes presumed lost by Trump: -118
At 2020-11-04T19:42:52Z, Trump = 3,074,501 (53.3%) and Biden = 2,618,806 (45.4%).
At 2020-11-04T19:45:52Z, Trump = 3,072,281 (53.2%) and Biden = 2,627,609 (45.5%).
 Votes presumed lost by Trump: -2,220
At 2020-11-04T20:45:58Z, Trump = 3,099,697 (52.4%) and Biden = 2,738,854 (46.3%).
At 2020-11-04T20:49:00Z, Trump = 3,096,601 (52.3%) and Biden = 2,747,272 (46.4%).
 Votes presumed lost by Trump: -3,096
At 2020-11-04T22:01:43Z, Trump = 3,124,031 (52.0%) and Biden = 2,811,627 (46.8%).
At 2020-11-04T22:03:40Z, Trump = 3,122,774 (51.9%) and Biden = 2,815,912 (46.8%).
 Votes presumed lost by Trump: -1,257
At 2020-11-04T22:18:53Z, Trump = 3,128,836 (51.9%) and Biden = 2,827,406 (46.9%).
At 2020-11-04T22:19:53Z, Trump = 3,130,032 (51.9%) and Biden = 2,822,457 (46.8%).
 Votes presumed lost by Biden: -4,949
At 2020-11-04T22:19:53Z, Trump = 3,130,032 (51.9%) and Biden = 2,822,457 (46.8%).
At 2020-11-04T22:36:54Z, Trump = 3,129,455 (51.8%) and Biden = 2,833,425 (46.9%).
 Votes presumed lost by Trump: -577
At 2020-11-04T22:41:51Z, Trump = 3,136,704 (51.8%) and Biden = 2,846,044 (47.0%).
At 2020-11-04T22:42:49Z, Trump = 3,137,930 (51.8%) and Biden = 2,841,098 (46.9%).
 Votes presumed lost by Biden: -4,946
At 2020-11-04T22:52:52Z, Trump = 3,138,637 (51.8%) and Biden = 2,841,739 (46.9%).
At 2020-11-04T22:54:49Z, Trump = 3,137,411 (51.7%) and Biden = 2,852,192 (47.0%).
 Votes presumed lost by Trump: -1,226
At 2020-11-04T23:12:52Z, Trump = 3,149,879 (51.6%) and Biden = 2,881,284 (47.2%).
At 2020-11-04T23:14:52Z, Trump = 3,146,132 (51.5%) and Biden = 2,883,446 (47.2%).
 Votes presumed lost by Trump: -3,747
At 2020-11-05T00:28:52Z, Trump = 3,176,641 (51.3%) and Biden = 2,941,334 (47.5%).
At 2020-11-05T00:34:29Z, Trump = 3,175,778 (51.2%) and Biden = 2,946,279 (47.5%).
 Votes presumed lost by Trump: -863
At 2020-11-05T00:39:58Z, Trump = 3,186,701 (51.1%) and Biden = 2,974,670 (47.7%).
At 2020-11-05T00:46:50Z, Trump = 3,184,493 (51.0%) and Biden = 2,978,438 (47.7%).
 Votes presumed lost by Trump: -2,208
At 2020-11-05T01:03:50Z, Trump = 3,195,938 (51.0%) and Biden = 2,995,409 (47.8%).
At 2020-11-05T01:20:52Z, Trump = 3,195,062 (50.9%) and Biden = 3,000,471 (47.8%).
 Votes presumed lost by Trump: -876
At 2020-11-05T02:18:57Z, Trump = 3,200,731 (50.9%) and Biden = 3,005,794 (47.8%).
At 2020-11-05T02:44:56Z, Trump = 3,199,611 (50.8%) and Biden = 3,016,956 (47.9%).
 Votes presumed lost by Trump: -1,120
At 2020-11-05T13:58:46Z, Trump = 3,220,020 (50.7%) and Biden = 3,054,891 (48.1%).
At 2020-11-05T14:04:26Z, Trump = 3,217,763 (50.5%) and Biden = 3,071,211 (48.2%).
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 Votes presumed lost by Trump: -2,257
At 2020-11-05T18:12:45Z, Trump = 3,233,161 (50.3%) and Biden = 3,117,461 (48.5%).
At 2020-11-05T18:18:46Z, Trump = 3,227,963 (50.2%) and Biden = 3,118,650 (48.5%).
 Votes presumed lost by Trump: -5,198
At 2020-11-05T20:44:39Z, Trump = 3,238,713 (50.2%) and Biden = 3,129,036 (48.5%).
At 2020-11-05T21:03:39Z, Trump = 3,235,860 (50.1%) and Biden = 3,138,978 (48.6%).
 Votes presumed lost by Trump: -2,853
At 2020-11-05T23:14:13Z, Trump = 3,262,742 (50.0%) and Biden = 3,184,436 (48.8%).
At 2020-11-05T23:26:53Z, Trump = 3,258,420 (49.9%) and Biden = 3,186,591 (48.8%).
 Votes presumed lost by Trump: -4,322
At 2020-11-06T00:12:10Z, Trump = 3,267,121 (49.9%) and Biden = 3,201,648 (48.9%).
At 2020-11-06T00:20:12Z, Trump = 3,260,786 (49.8%) and Biden = 3,201,856 (48.9%).
 Votes presumed lost by Trump: -6,335
At 2020-11-06T01:32:40Z, Trump = 3,272,692 (49.8%) and Biden = 3,220,119 (49.0%).
At 2020-11-06T01:50:36Z, Trump = 3,269,835 (49.7%) and Biden = 3,223,781 (49.0%).
 Votes presumed lost by Trump: -2,857
At 2020-11-06T03:12:40Z, Trump = 3,280,578 (49.7%) and Biden = 3,234,373 (49.0%).
At 2020-11-06T03:32:40Z, Trump = 3,277,968 (49.6%) and Biden = 3,244,924 (49.1%).
 Votes presumed lost by Trump: -2,610
At 2020-11-06T03:42:34Z, Trump = 3,284,867 (49.6%) and Biden = 3,258,376 (49.2%).
At 2020-11-06T04:28:44Z, Trump = 3,280,158 (49.5%) and Biden = 3,260,278 (49.2%).
 Votes presumed lost by Trump: -4,709
At 2020-11-06T23:24:40Z, Trump = 3,305,179 (49.3%) and Biden = 3,318,587 (49.5%).
At 2020-11-06T23:38:39Z, Trump = 3,298,742 (49.2%) and Biden = 3,318,856 (49.5%).
 Votes presumed lost by Trump: -6,437
At 2020-11-07T02:40:18Z, Trump = 3,310,508 (49.2%) and Biden = 3,337,422 (49.6%).
At 2020-11-07T03:40:45Z, Trump = 3,305,351 (49.1%) and Biden = 3,339,010 (49.6%).
 Votes presumed lost by Trump: -5,157
At 2020-11-08T18:36:39Z, Trump = 3,317,639 (49.1%) and Biden = 3,358,181 (49.7%).
At 2020-11-08T19:58:46Z, Trump = 3,311,557 (49.0%) and Biden = 3,358,865 (49.7%).
 Votes presumed lost by Trump: -6,082
Total votes presumed switched from Trump to Biden: -220,884
Total votes presumed switched from Biden to Trump: -24,723

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At 2020-11-04T00:09:04Z, Trump = 837,903 (53.2%) and Biden = 724,503 (46.0%).
At 2020-11-04T00:09:47Z, Trump = 838,621 (53.2%) and Biden = 723,547 (45.9%).
 Votes presumed lost by Biden: -956
At 2020-11-04T00:13:10Z, Trump = 1,269,941 (49.3%) and Biden = 1,282,821 (49.8%).
At 2020-11-04T00:13:49Z, Trump = 1,271,335 (49.3%) and Biden = 1,281,650 (49.7%).
 Votes presumed lost by Biden: -1,171
At 2020-11-04T00:19:52Z, Trump = 2,162,332 (48.9%) and Biden = 2,224,239 (50.3%).
At 2020-11-04T00:20:14Z, Trump = 2,158,087 (48.8%) and Biden = 2,224,422 (50.3%).
 Votes presumed lost by Trump: -4,245
At 2020-11-04T00:31:07Z, Trump = 3,449,266 (49.9%) and Biden = 3,400,879 (49.2%).
At 2020-11-04T00:31:47Z, Trump = 3,462,078 (50.0%) and Biden = 3,399,761 (49.1%).
 Votes presumed lost by Biden: -1,118
At 2020-11-04T00:34:45Z, Trump = 3,772,148 (48.8%) and Biden = 3,888,095 (50.3%).
At 2020-11-04T00:35:46Z, Trump = 3,784,166 (48.9%) and Biden = 3,884,768 (50.2%).
 Votes presumed lost by Biden: -3,327
At 2020-11-04T00:49:07Z, Trump = 4,629,168 (49.4%) and Biden = 4,657,281 (49.7%).
At 2020-11-04T00:50:07Z, Trump = 4,630,468 (49.4%) and Biden = 4,649,215 (49.6%).
 Votes presumed lost by Biden: -8,066
At 2020-11-04T00:52:14Z, Trump = 4,661,990 (49.5%) and Biden = 4,671,408 (49.6%).
At 2020-11-04T00:52:49Z, Trump = 4,662,348 (49.5%) and Biden = 4,662,348 (49.5%).
 Votes presumed lost by Biden: -9,060
At 2020-11-04T00:56:47Z, Trump = 4,702,413 (49.6%) and Biden = 4,683,452 (49.4%).
At 2020-11-04T00:57:07Z, Trump = 4,695,606 (49.5%) and Biden = 4,705,092 (49.6%).
 Votes presumed lost by Trump: -6,807
At 2020-11-04T00:57:53Z, Trump = 4,696,716 (49.5%) and Biden = 4,706,204 (49.6%).
At 2020-11-04T00:58:22Z, Trump = 4,703,675 (49.5%) and Biden = 4,703,675 (49.5%).
 Votes presumed lost by Biden: -2,529
At 2020-11-04T01:00:52Z, Trump = 4,738,130 (49.6%) and Biden = 4,728,577 (49.5%).
At 2020-11-04T01:01:09Z, Trump = 4,739,121 (49.6%) and Biden = 4,720,012 (49.4%).
 Votes presumed lost by Biden: -8,565
At 2020-11-04T01:06:59Z, Trump = 5,017,335 (49.8%) and Biden = 4,956,885 (49.2%).
At 2020-11-04T01:07:47Z, Trump = 5,021,398 (49.8%) and Biden = 4,950,816 (49.1%).
 Votes presumed lost by Biden: -6,069
At 2020-11-04T01:09:49Z, Trump = 5,085,598 (50.0%) and Biden = 4,983,887 (49.0%).
At 2020-11-04T01:10:15Z, Trump = 5,091,622 (50.0%) and Biden = 4,979,606 (48.9%).
 Votes presumed lost by Biden: -4,281
At 2020-11-04T01:22:34Z, Trump = 5,244,095 (50.3%) and Biden = 5,077,285 (48.7%).
At 2020-11-04T01:22:48Z, Trump = 5,245,630 (50.3%) and Biden = 5,068,342 (48.6%).
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 Votes presumed lost by Biden: -8,943
At 2020-11-04T01:29:03Z, Trump = 5,331,521 (50.5%) and Biden = 5,120,372 (48.5%).
At 2020-11-04T01:29:54Z, Trump = 5,340,447 (50.5%) and Biden = 5,118,369 (48.4%).
 Votes presumed lost by Biden: -2,003
At 2020-11-04T01:33:18Z, Trump = 5,357,569 (50.6%) and Biden = 5,124,631 (48.4%).
At 2020-11-04T01:33:31Z, Trump = 5,347,198 (50.5%) and Biden = 5,124,839 (48.4%).
 Votes presumed lost by Trump: -10,371
At 2020-11-04T01:44:45Z, Trump = 5,379,674 (50.6%) and Biden = 5,145,775 (48.4%).
At 2020-11-04T01:45:12Z, Trump = 5,384,132 (50.6%) and Biden = 5,139,399 (48.3%).
 Votes presumed lost by Biden: -6,376
At 2020-11-04T01:50:48Z, Trump = 5,423,906 (50.7%) and Biden = 5,167,153 (48.3%).
At 2020-11-04T01:57:51Z, Trump = 5,445,856 (50.8%) and Biden = 5,167,131 (48.2%).
 Votes presumed lost by Biden: -22
At 2020-11-04T02:05:25Z, Trump = 5,505,366 (51.0%) and Biden = 5,192,316 (48.1%).
At 2020-11-04T02:07:06Z, Trump = 5,508,029 (51.0%) and Biden = 5,184,027 (48.0%).
 Votes presumed lost by Biden: -8,289
At 2020-11-04T02:40:10Z, Trump = 5,577,566 (51.1%) and Biden = 5,228,285 (47.9%).
At 2020-11-04T02:40:20Z, Trump = 5,591,302 (51.2%) and Biden = 5,220,004 (47.8%).
 Votes presumed lost by Biden: -8,281
At 2020-11-04T02:51:28Z, Trump = 5,597,034 (51.2%) and Biden = 5,225,356 (47.8%).
At 2020-11-04T02:52:22Z, Trump = 5,597,162 (51.2%) and Biden = 5,214,544 (47.7%).
 Votes presumed lost by Biden: -10,812
At 2020-11-04T03:28:01Z, Trump = 5,614,476 (51.2%) and Biden = 5,241,640 (47.8%).
At 2020-11-04T03:31:51Z, Trump = 5,615,220 (51.2%) and Biden = 5,231,367 (47.7%).
 Votes presumed lost by Biden: -10,273
At 2020-11-04T03:35:25Z, Trump = 5,615,538 (51.2%) and Biden = 5,242,631 (47.8%).
At 2020-11-04T03:43:01Z, Trump = 5,616,325 (51.2%) and Biden = 5,232,397 (47.7%).
 Votes presumed lost by Biden: -10,234
At 2020-11-04T04:37:06Z, Trump = 5,635,892 (51.2%) and Biden = 5,261,633 (47.8%).
At 2020-11-04T04:45:56Z, Trump = 5,636,480 (51.2%) and Biden = 5,251,174 (47.7%).
 Votes presumed lost by Biden: -10,459
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**Total votes presumed switched from Trump to Biden: -21,423**
**Total votes presumed switched from Biden to Trump: -120,834**