Stats

Last year, traffic congestion cost U.S. drivers nearly $305 billion in wasted time and fuel, higher costs for goods passed along to consumers and other expenses. That's an average of $1,445 per driver.

10 billion to spend in 10 years

Idling cars are a major source of greenhouse emissions, generating an estimated 30 million tons of carbon dioxide annually

Analysts found that metro Atlantans spent an average of 70 hours in traffic jams during peak travel times. That costs each driver $2,212 and the city more than $7 billion.

ATLANTA – The Atlanta City Council has approved the Fiscal Year 2019 budget for the City of Atlanta. The $661.4 million budget is the first to be proposed by Mayor Keisha Lance Bottoms and focuses on the Administration's priorities including public safety, economic development, equity, transparency and the quality of life of all city residents.

Issues

- Broken traffic lights
- Waste of fuel
- EMC Services not making it to the scene quickly
- Highways

Software

- Heat maps
- Car app
- Traffic lights
- Ambulance alerts
- Heat maps for services
- Wi Fi 6

1) EMC and police have a separate network
2) Accident occurs
3) Generate alert to send to the EMC services to know the location of rec
4) Send to police as well
5) Generate separate push notification as a personal traffic alert in each car through the app/through the wifi networks

Public Nonsense

- 100904369460 kWh in coal consumption in Atlanta
- $200 million to provide 5G
- 70 billion KW to run the internet for the US
- 28641249545791 kWh US total usage
- 821243752837 kWh ATL total usage

- 541928414 kWh return in power
- 1484735 kWh per day
- 3702 fully charged Nissan Leafs
- 2116 fully charged Tesla Model Xs
- 2.4 kWh/day
- 61712 traffic lights

MR84 Highest Performance Wireless
2.5 Gbps radio rate - $2,399 / AP
2.4 GHz Sector Antenna (11 dBi gain) $349
5 GHz Sector Antenna (13 dBi gain) $349

Microsegmentation

Donald lee avenue(N) to morland avenue(E) to

5 year plan
3.52 sq mi

1673 city blocks
Wifi powered electric buses

Cost
MERAKI wifi access points- $709,400 per year, $3,547,000 (total)
MERAKI Heat map- $70,000 per year, $ 350,000 (total)
Rectenna- $5,000 per year, $25,000(total)
App- $8,333.33 per year, $100,000 (total)
Data storage- $63,000 per year, $316,554(total)
*Security (stealthwatch cloud)- $58,000 per year, $250,000 (total) + $40,000 = $290,000
Total Cost- $925,711 per year $4,628,554 (total)

item	# of items	cost	Total amount
Wifi access point (meraki)	1000	3547000	-
Heat Map	1	350,000	
app	1	100,000 (total)	

Data storage(AWS)	250 Tb	63,000 (/yr)	

135.8 million

Use aws to store location data

36++

3 Issue:

1. Inefficient traffic light
2. EMC service making it to the scene quickly
3. Highway traffic appalling

Industries Benefiting:

1. EMC
2. Law enforcement
3. Public transportation/ public utilities
4. Businesses

Integrate via api call with meraki
Lambda call

Use Cases:

- Use location data and heat maps to dynamically update traffic signals based on congestion
- Provide real time location data to emergency services personnel and optimize routes to the accident scene
- Utilize power from a wifi signal broadcast throughout the city to power traffic control devices, decreasing the amount of power needed from the city power grid

To Do list:

1. Finish wifi conversion formula
    a. How to implement
    b. Specialized antenna need to convert power from wifi
        i. Traffic lights
        ii. rod/highway sign
        iii. Pedestrian crossing
2. Cost analysis
    a. Wifi aps's
    b. New traffic control devices
    c. App development
    d. Data storage
    e. Hardware upgrades
3. Create heatmap demo
4. Make presentation and script it out
5. Figure out data storage
6. Figure out how to process the location and send it to the traffic control devices
7. Android auto/ apple car play navigation APP USING GOOGLE MAPS DATA

Good ideas

- emc need separate app
- Android auto car play or apple car play app to direct traffic to optimized tracio signals
- Connect to the wifi throughout the app; need the app to get on wifi; incentive
- Daily deals through the app based on proximity to local businesses; makes app users uneasy about location tracking services
    - Enable push notification and allow user to choose whether or not they want app

Roll out plan in chronological order:

1. City wide wifi 6
2. App development
3. Data consolidation and analysis of user location information
4. Dynamic update of traffic control devices/ EMC network creation
5. Retrofitting traffic control devices with wifi 6 power antenna

Use Cases processes:

1. Use location data and heat maps to dynamically update traffic signals based on congestion
    a. Location data generated from wifi usage in app

i. Need the app to use public wifi, and authentication process will ensure the user has the app

ii. Terms and condition ensures that legally the user agrees to have location data used and that the app can “collaborate with location”

b. Generate heatmaps that will relay information to the traffic lights

i. Use cisco Meraki to facilitate tracking and generation of the heat maps

ii. Allows for better understanding of traffic patterns and will make use of real time data gathered from app

c. Data is stored in the cloud

i. Use AWS to store heatmap data from meraki

ii. Benefits: AWS and cisco already work together to “accelerate innovation”, no physical data center, fast deployment, secure: all data protected by AWS security measures

d. Data relayed to traffic signals

i. Create a seperate network using public wifi, and increase security making sure no public user can hack or use the same network as the traffic signals

ii. Use this network to transfer the data to the traffic lights

iii. Benefits: high speed, low cost

e. Signals use data to update themselves based on real time congestion

i. Traffic light receive the data and interprets it to change light signal accordingly using ML

2. Provide real time location data to emergency services personnel and optimize routes to the accident scene

a. Emc have a separate network

i. They still use the public wifi but have a different access method to place them on a separate network, and access to different information

b. User places the 911 call
    i. If unsure of exact location then the user can use the app from the dashboard or the phone to send the location to emergency services
c. Notifies the EMC of the accident and heavy traffic for best routes to get to the scene
d. Alerts users along the route that the EMC are approaching

3. Utilize power from a wifi signal broadcast throughout the city
    a. Convert the wifi signal into dc power
        i. Obtain wifi from the access point location all around
        ii. Use antennas
            1. Antennas convert signals into usable power
            2. This power is then used to power to devices that they are installed in
                a. Small devices with easy installation
    b. Power the devices
        i. Antennas convert incoming wifi signals into dc power to continuously power the traffic signal
    c. Benefits
        i. Power gets recycled
            1. Power plants power the wifi access point
            2. Wifi produces power for certain devices with 30% recovery rate is bound to increase in the near future

Cybersecurity:

1. AWS
    a. AWS provides several security capabilities and services to increase privacy and control network access.
        i. Network firewalls in amazon vpn(virtual private network)
        ii. web application firewall capabilities in AWS(amazon web service) WAF let you create private networks
        iii. control access to your instances and applications
        iv. Automatic encryptions
        v. Automatic responses to DDOS(distributed denial of service) attacks
        vi. hardware-based cryptographic key storage using AWS CloudHSM
        vii. Multi-factor authentication for access controls
2. Stealth watch cloud
    a. Automatic configuration and threat detection
    b. Alerts on suspension behavior
        i. If an entity shows abnormal behavior or signs of malicious activity, an alert is generated so you can quickly investigate it.
    c. Ability to monitor the network
    d. Scalability
3. Inputs and outputs of the network, to see what is send and categorized itself
4. Sets alams to see watch traffic is going, and observe to see if the traffic is malicious
5. Alert mapping: proxies and visibility to set sensitive to see certain attacks
6. An aws cloud product, 20 or so alerts specific to aws
7. Meraki api for easy api integration with other technologies
8. Lamda can take action for certain alerts

Solutions:

- Partner with Google to license the api's and use that information to change the traffic light dynamically with our own ml
- Use an algorithm to determine the traffic

Hari's notes:

Data set before running ML Alg?

Amazon AWS S3

EC2, reserve instances

Amazon stuff and heatmap application is running on Linux

Cisco retail partners, more retailers want to partner up with cisco
Charge retailers
Where is the money coming from, and why should we spend that much
Conceding points

Set each car/person as a data point
Track the speed of travel of these data-points in relation to the mileage

Price rebuttal: boosts business/economy of atlanta, long run energy savings costs, atlanta budget