A Weather-Ready Nation Decision Support Tool for Protecting Vulnerable Communities

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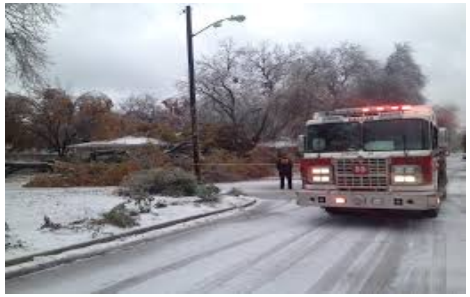
Overview

- As a Weather-Ready Nation Ambassador, SAIC has demonstrated the effective use of new, big data technologies to fuse and analyze large streams of disparate data to provide enhanced situational awareness and decision support tools
- We developed a prototype decision support tool to help first responders identify people at-risk during high impact weather events
  - Combined census data with real time weather observations, radar data, and tweets to identify at-risk residents during weather related power outages (e.g. elderly, freezing conditions, power is out).
- The utility of the prototype was demonstrated using data from the Dallas, TX ice storm on December 5-7, 2013 when 270,000 customers lost power.


Prototype Components

A. Data Inputs

- U.S. Census data to locate elderly on a 1 km grid
- METAR data from NCDC to provide wind and temperatures
- Radar data from NCDC for ice accumulation information
- Tweets to confirm power outage locations

B. Technologies

- Amazon Web Services for a variety of low-cost, on-demand servers
- Amazon Kinesis for real-time processing of streaming data from numerous sources
- Postgres/PostGIS for storing and displaying gridded information

C. Benefits

- Build apps very quickly (less than 4 weeks) in a very powerful development environment
- Handle Velocity, Variety, and Volume
- Scalable

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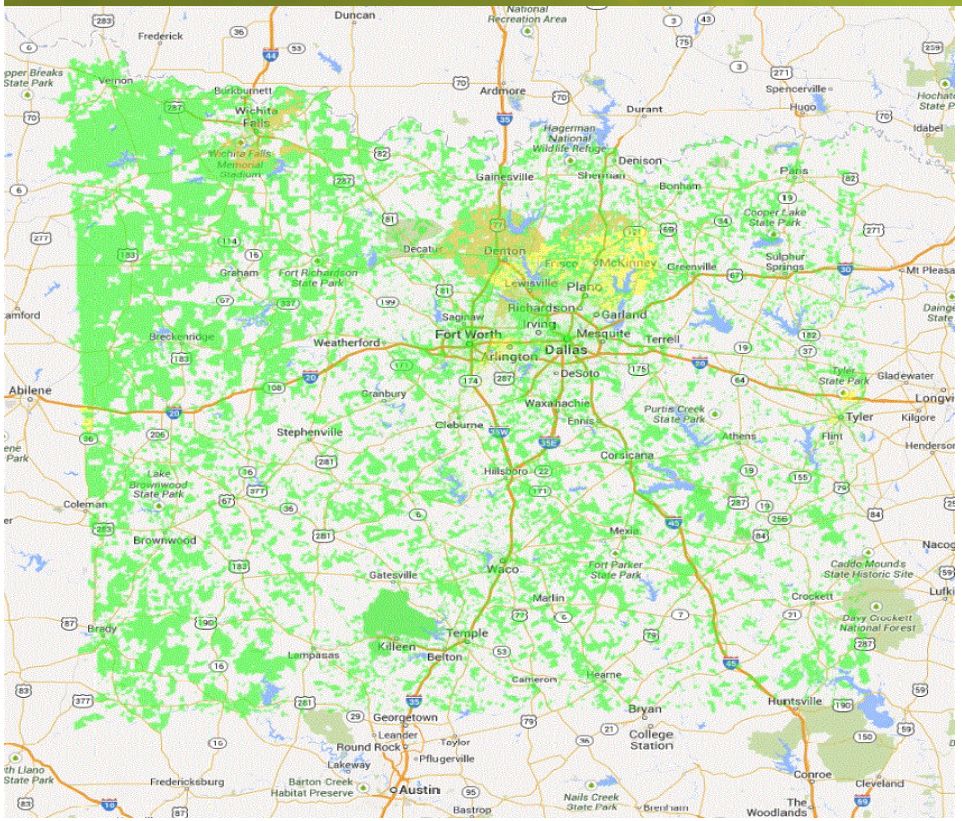
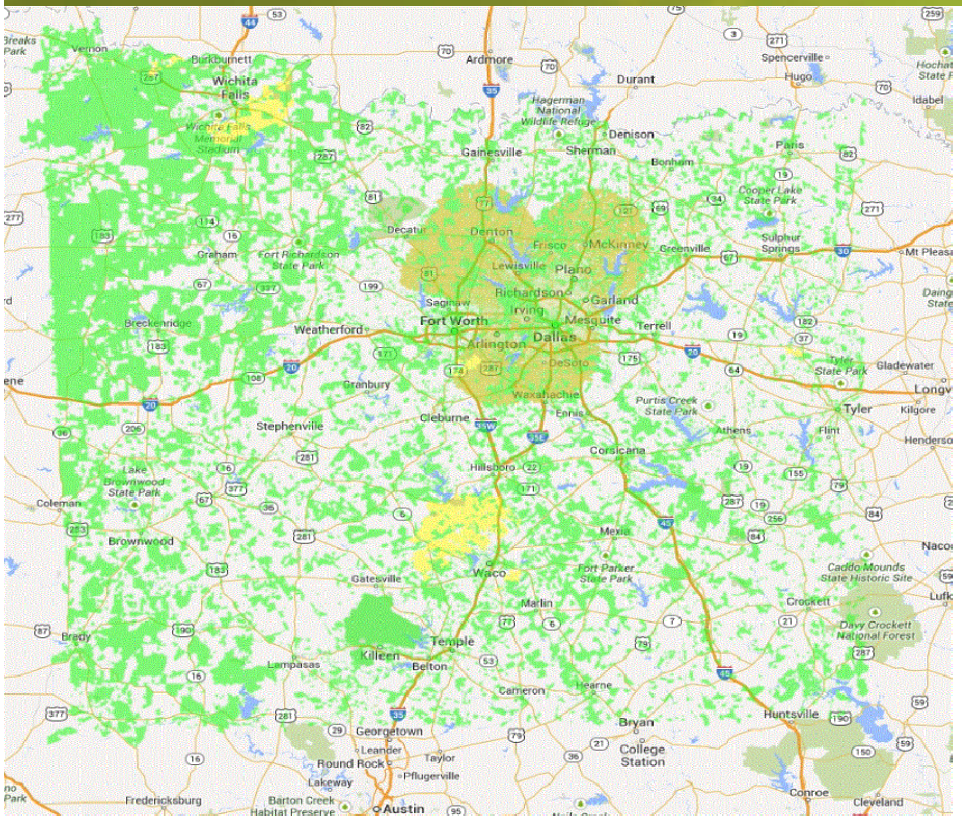
Initial Indications of High Winds, Low Temps, and Accumulating Ice



COLOR KEY

- Elderly Present
- Elderly Present + Power Could Be Out
- Elderly Present + Power Likely Out

Pervasive High Winds, Low Temps, and Accumulating Ice



COLOR KEY

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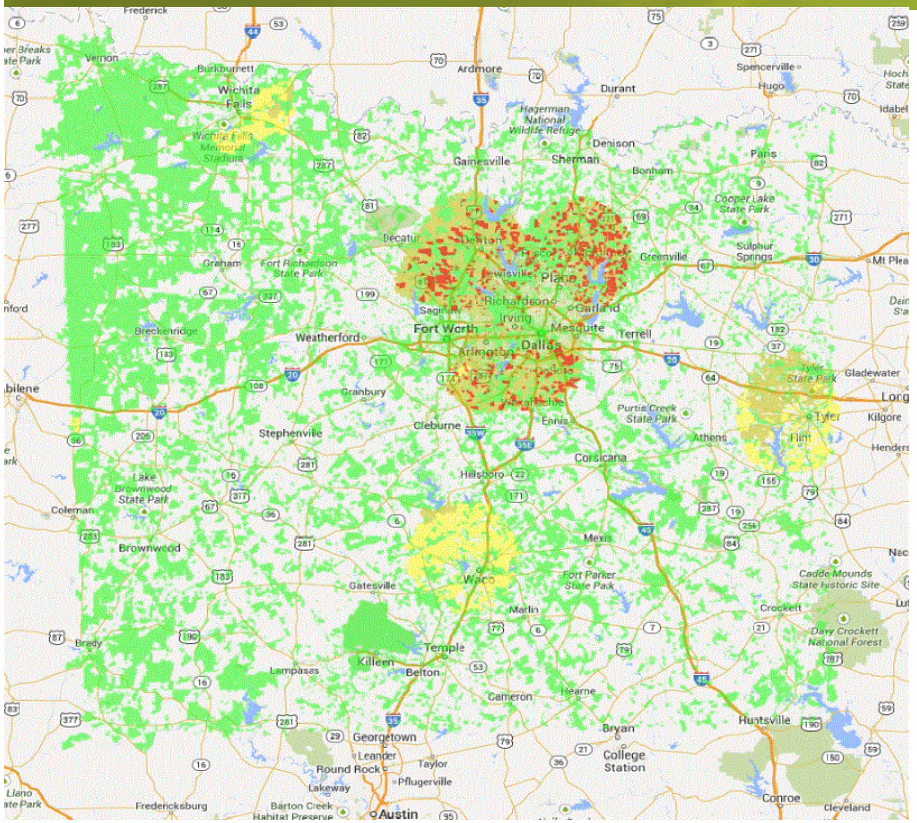
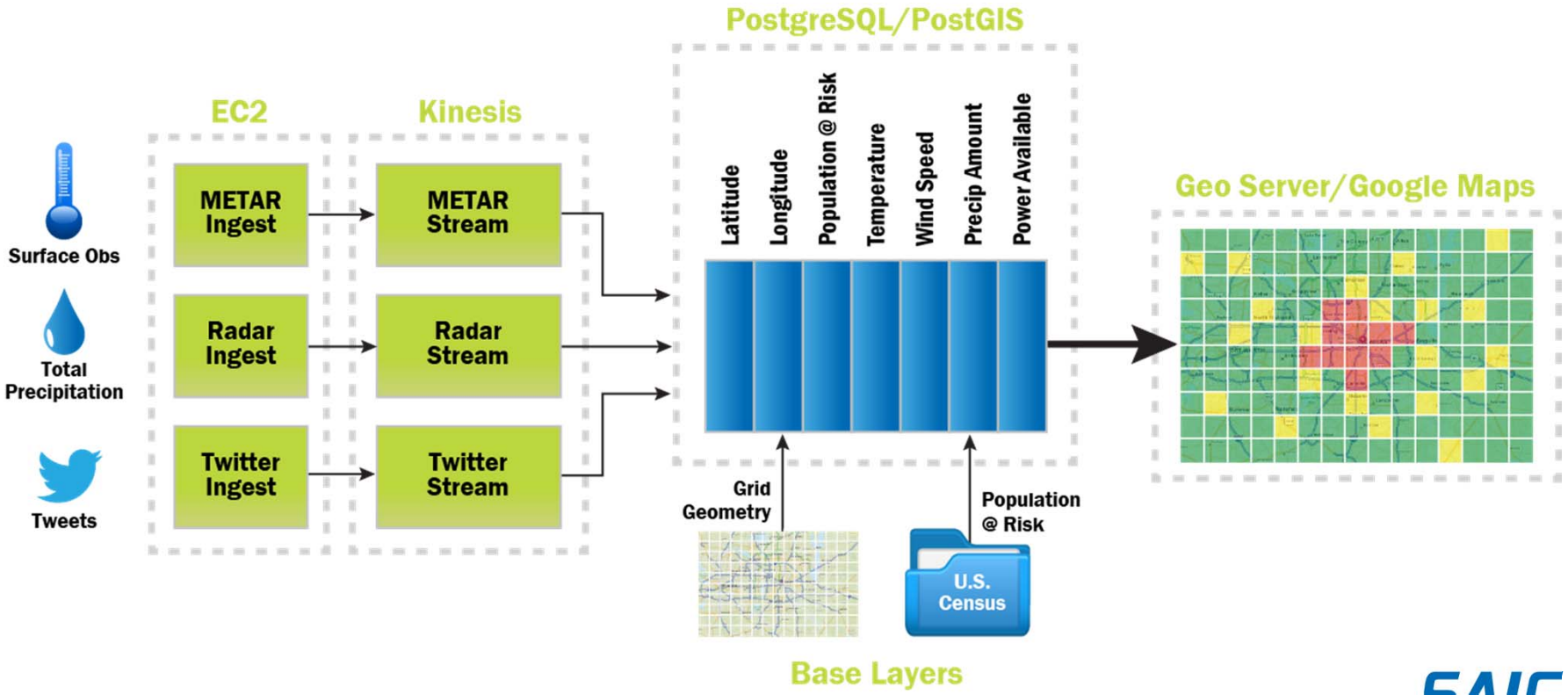
Pervasive High Winds, Low Temps, Accumulating Ice, and Power Outages



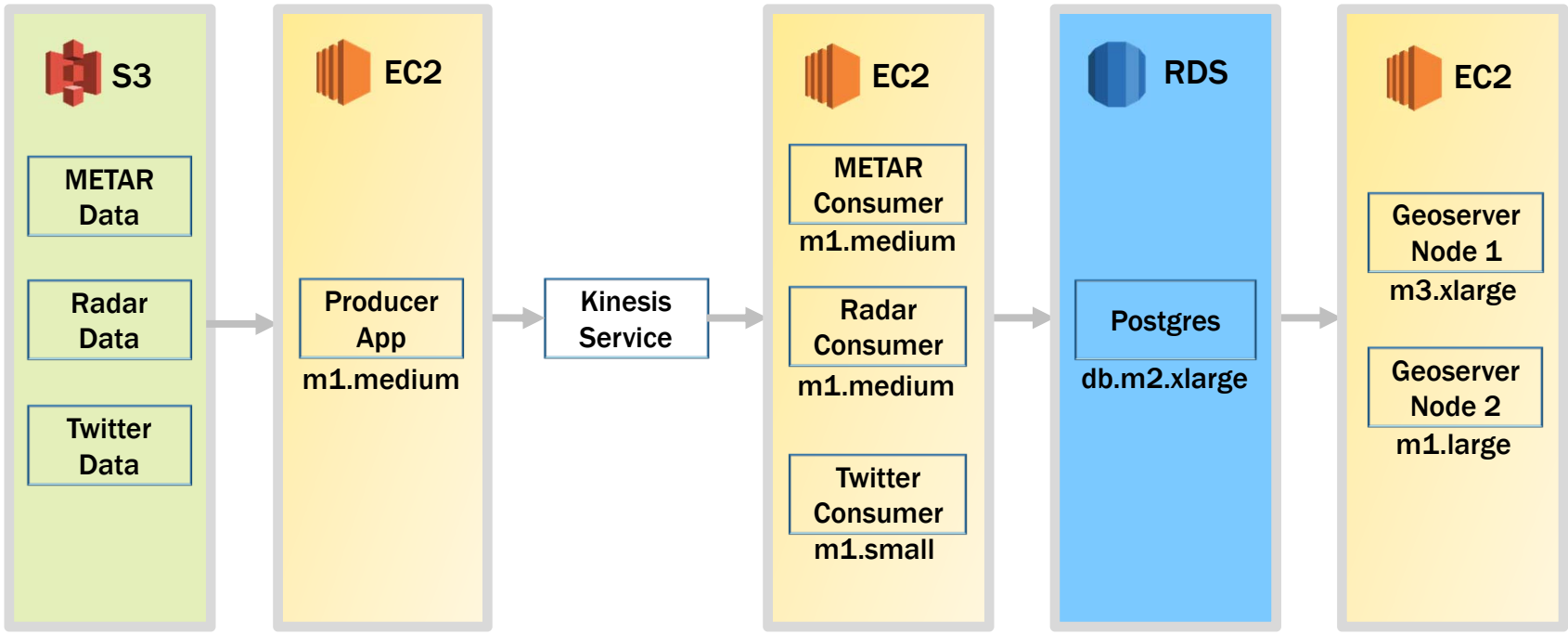
COLOR KEY

- Elderly Present
- Elderly Present + Power Could Be Out
- Elderly Present + Power Likely Out
- Power Outages Confirmed

Impact Based Decision Support System – Architecture



Architecture



Server Cost: $1.83/hr

Candidate Enhancements/Next Steps

- Add weather forecasts to facilitate pre-event planning
- Incorporate detailed outage data from utilities
- Include other data sources to further refine locations for “people at risk” (e.g. nursing home patients, people with disabilities, etc.)
- Develop advanced tweet analysis algorithms, including location information
- Incorporate other social media streams (Tumblr, Facebook, Instagram, etc.)
- Incorporate algorithms and visualizations for additional severe weather events (e.g. floods, icing, fires, and snowfall)
- Develop a mobile app for first responders
- Release as an open source project

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Thank You

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