



Using Analytics to Improve Customer Communications

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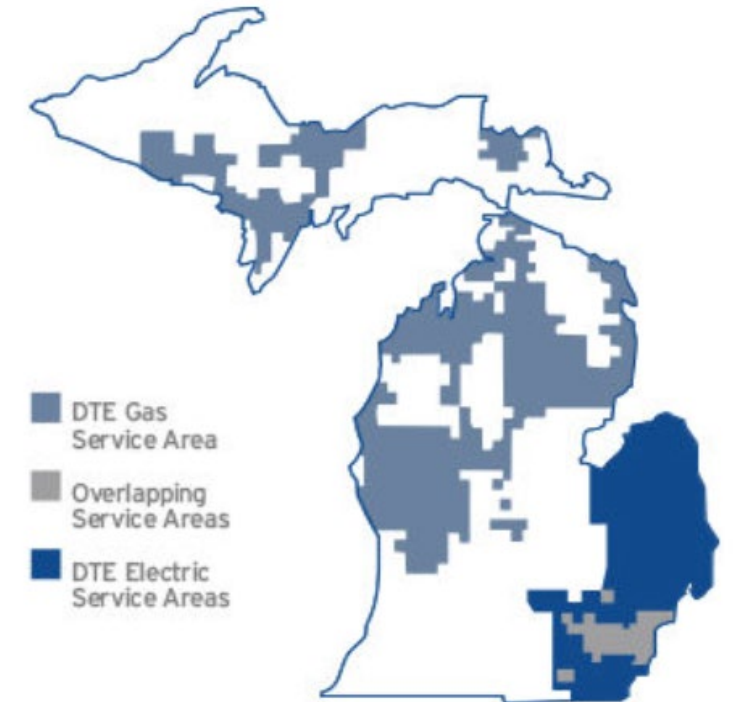


- About DTE Energy
- About Power Outages
- Overview of the EFC Project
- Analytics for Outage Management
- Analytics for Data Quality
- Acknowledging Partners
- Q & A



- Headquartered in Detroit, MI
- More than 10,000 employees
- DTE Electric
 - Electric generation and distribution
 - 2.3 million electric utility customers in Southeastern Michigan
 - More than 11,000 megawatt system capacity
- DTE Gas
 - Natural gas transmission, storage and distribution
 - 1.3 million customers throughout Michigan

Service Area Map





Customer Interactions During Power Outages

Aside from customer billing and related processes, customer interactions with DTE are usually related to power outages: reporting outages and checking for status updates. Consistent with national figures, power outages for DTE customers are most commonly related to weather incidents.

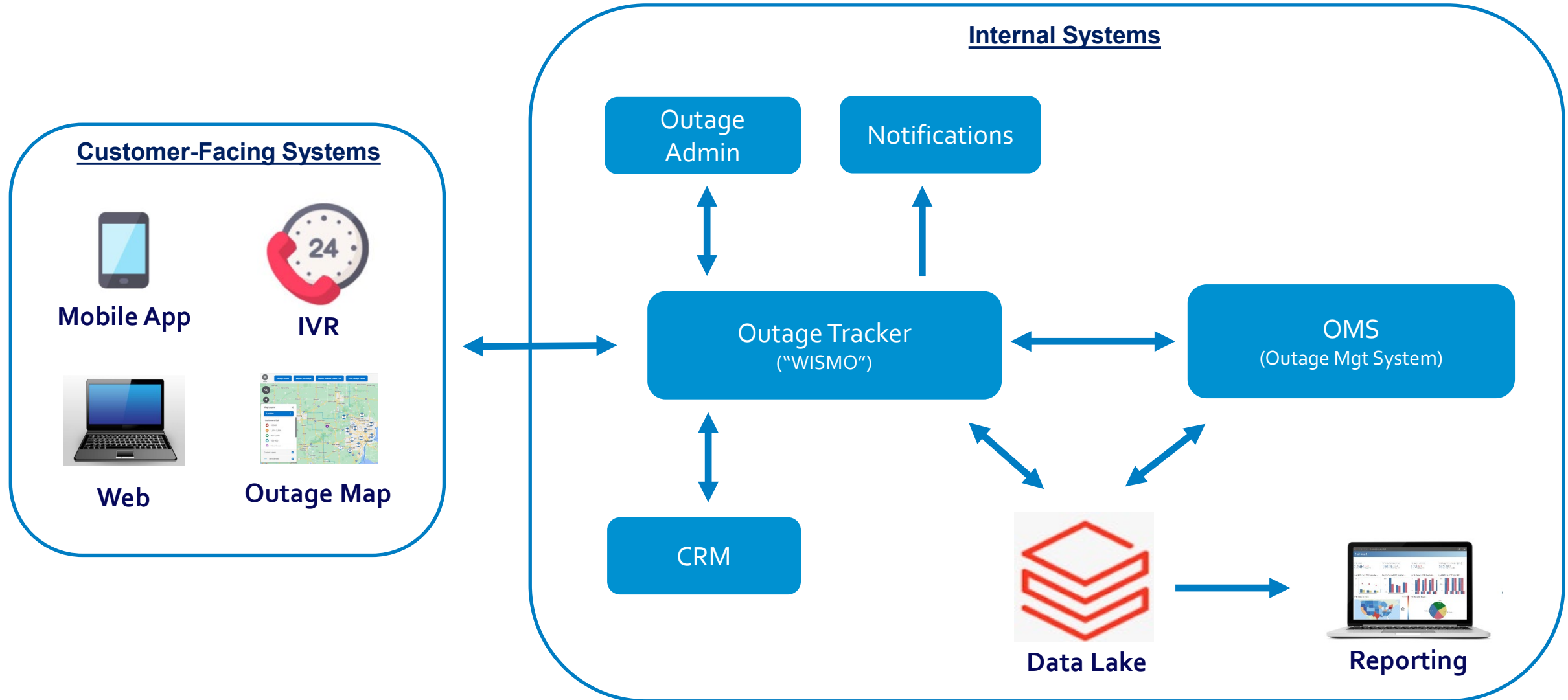




Improving Customer Communications – EFC Project

Error-Free Customer Communications (EFC) Project: Starting in late 2021, and currently underway, DTE has embarked on a broad initiative to improve customer-facing processes to report power outages/issues, and check status on resolution.

- Re-design of customer-facing systems to support outage communications
- Re-design & enhancements to several internal DTE applications
- Redeployment of key systems legacy architectures to a more modern, Microsoft cloud platform
- Enhanced internal systems to scale up support for large storms
- Improved monitoring, with enhanced triaging and ability to manage key events



We're testing all new functionality, using modern automated testing tools during the development process, enabling rapid regression testing of new enhancements – before they are rolled to production.

Test Case Hierarchy (top 3 tiers):

Types of customer interactions:

- Report outage
- Get status

Types of outages can be reported:

- Power out
- Partial power out
- Dim or bright lights
- Flickering lights

Customer interaction methods:

- IVR (phone)
- Website
- CRM



- **300+** automated Test Cases, representing all user stories to report an outage or get status
- **600+** unique Test Scenarios/Conditions, each utilizing different datasets for different outcomes
- Load testing utilizing API's across all systems to ensure WISMO functions properly during a major outage event → **1 Million** outages at the same time!



Outage Management Status & Triage:

- Improved understanding of the scope and scale of major outage events
- Location of outages and their respective lifecycles
- Elimination of latency in reporting with real-time analysis and alerts

Customer Experience Improvement:

- Analysis of customer service narratives to better understand the customer journey
- Detection of outliers in customer data due to data quality issues
- Improvement of data quality on the outage map



Key Analytics Requirements & Assets

Key Questions:

- What are the key metrics?
- How many reported outages?
- What is the current job status?
- What are the lifecycles of customer outages and DTE responses?
- Where are the exceptions and outliers?
- Where is data quality inhibiting communication with customers?

The screenshot shows the WISMO dashboard with the following sections visible:

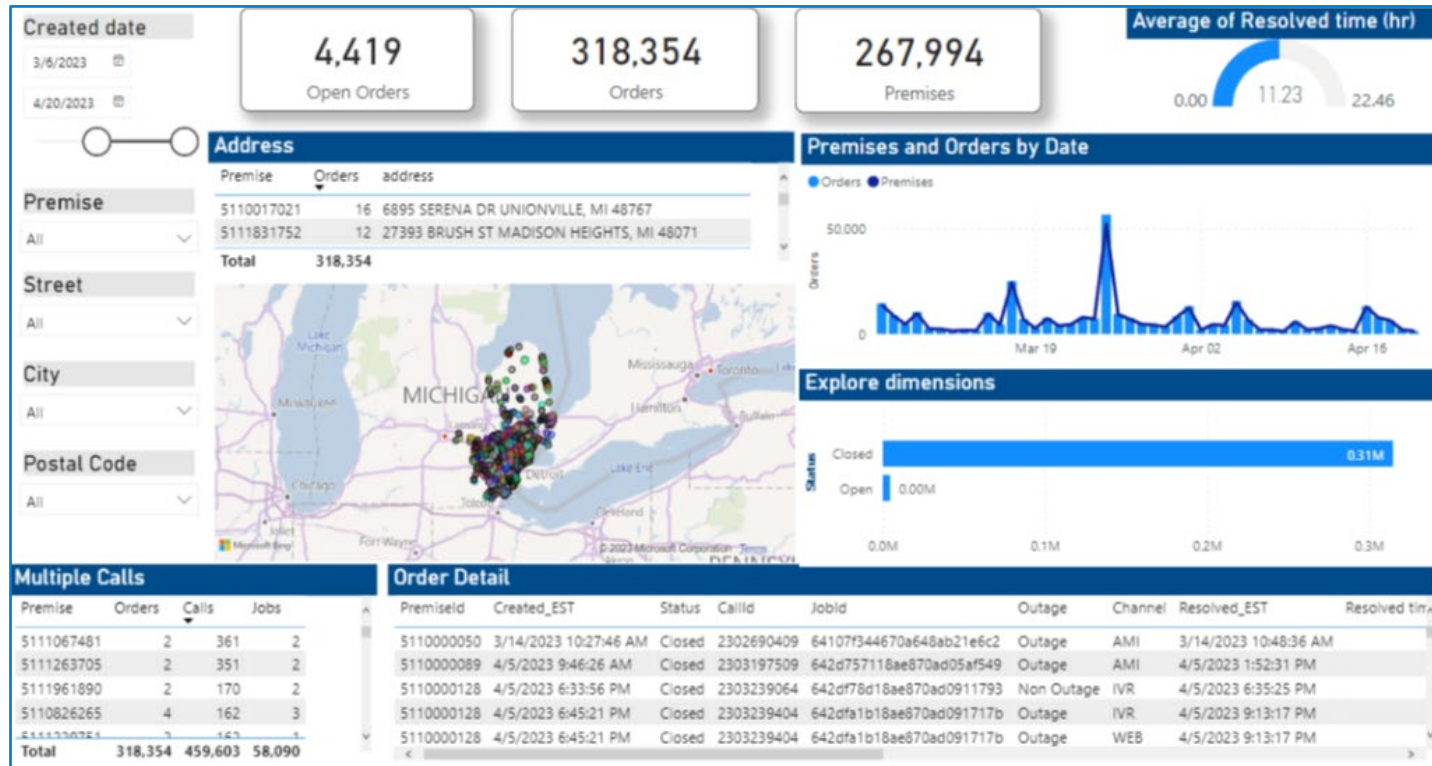
- WISMO Orders
- WISMO Jobs
- ADMS Exceptions Dashboard
- PPS vs WISMO Prod
- Force_Closed
- Storm Mode Tracking
- Corrective Data - Time Compari...
- Orphan Orders

The screenshot shows the STORM DASHBOARD with the following sections and data:

- STORM DASHBOARD** (Orders from 8/29/2022 4:00:05 PM to 9/4/2022 4:59:27 PM, Storm: 202208, Data Refreshed: 9/7/2022 11:29:21 AM)
- Summary Metrics:** 371,199 (DTE Customers), 370,982 (DTE Customers), 217 (Out), 411,634 (All Customers)
- Customers Out by Time:** Line chart showing outage volume over time.
- Customers Impacted by Storm:** Summary metrics: 4,419 Open Orders, 318,354 Orders, 267,994 Premises.
- Map:** Map of Michigan showing outage locations.
- Job Outlier Distance:** Table with columns: JobID, Order, Order Premise, Distance, Outlier Address.
- Job Detail:** Table with columns: JobID, Order, Order Premise, Distance, Outlier LPT, JobID, Order, Order Premise, Distance, Outlier LPT.



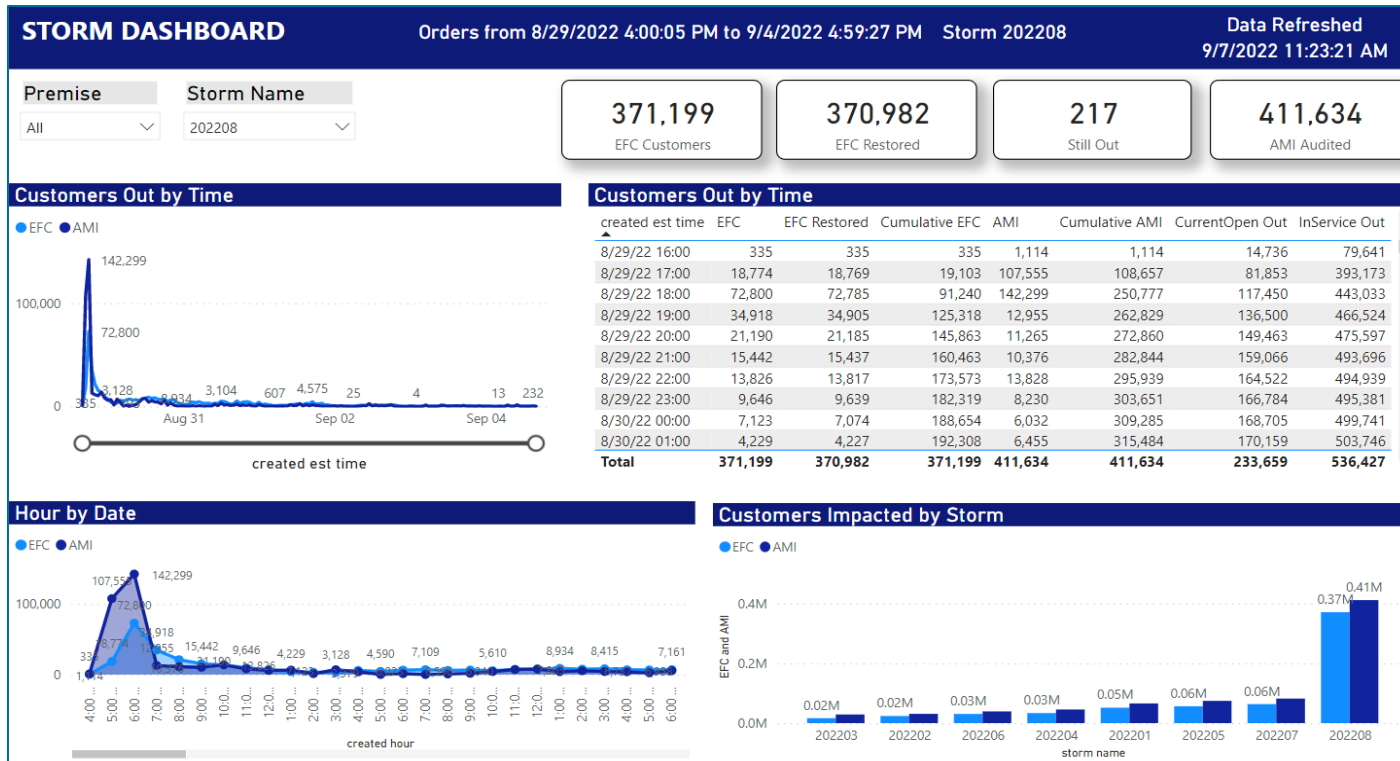
Outage Status Dashboard



- Real-time open outage status
- Outage lifecycle status (Open > ETR > Restored)
- Outage lifecycle phase duration
- Outage clusters & various related KPIs



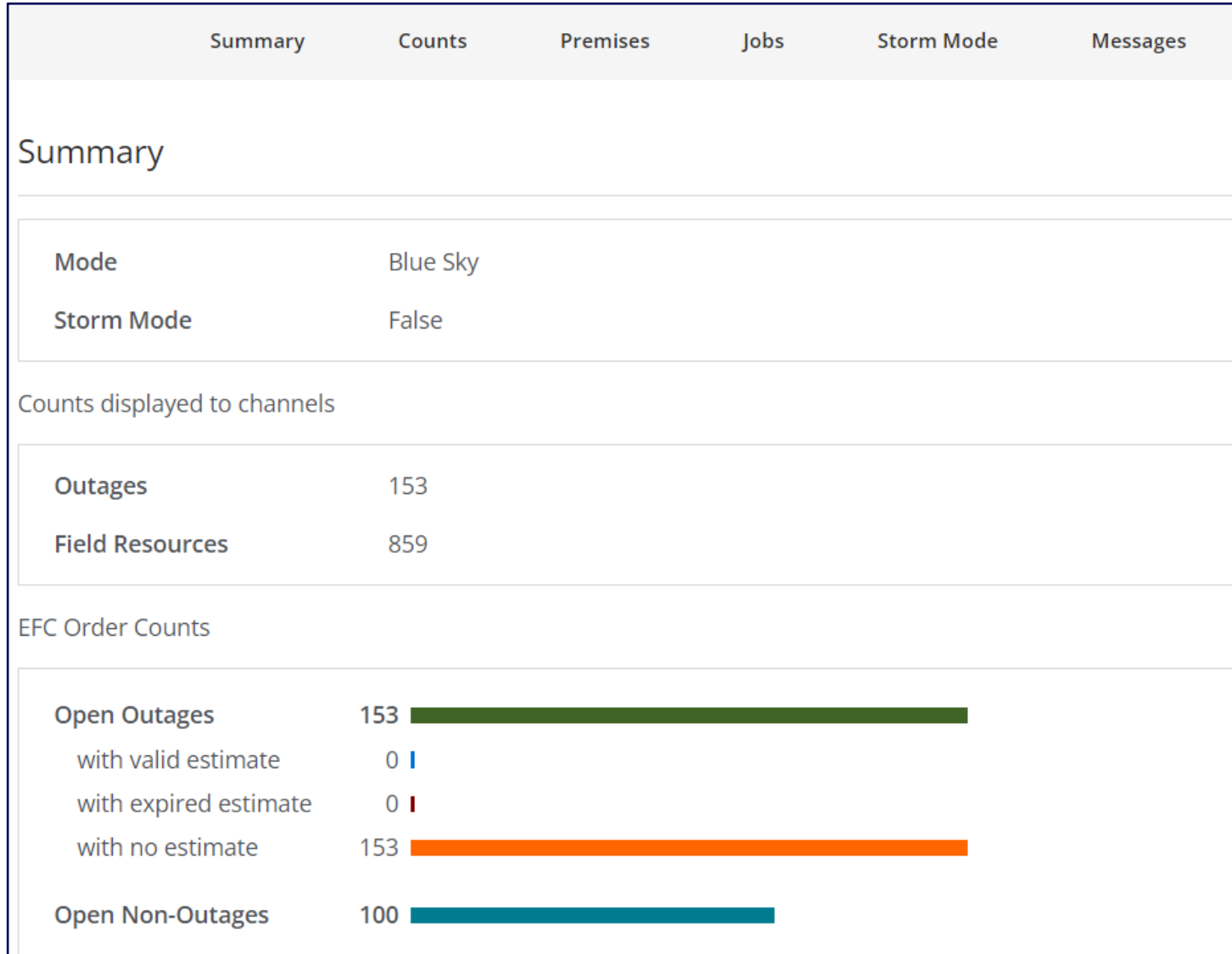
Storm Dashboard



- Where are we in the storm?
- How many customers are impacted?
- What is the restoration progress?
- Outage time series
- Comparison to previous storm events



Outage Admin Dashboard



- Active outage summary with the ability to drilldown to an individual customer
- Manages storm messaging and events
- Identifies the correlation between the current customer status, and the “job” activity to restore a customer outage



Data Quality Identification & Remediation

Master list of data quality reports

- No Meter Address
- Non-Active/Vacant Premises
- Early OnDate
- Single AMI Call Cnclcd
- OrgEventTime_ExtHistTime
- 3 Hour Delay
- Never No Status
- Predicted_NeedConfirmation
- BadRead
- No 95% Rule
- RCallsTBTrue
- RCall After PS Yes
- Pending Customer Reports
- Missing JobID
- CReports Not in ReportedCall
- Orders - Non AMI Meters
- No Matching CallCode



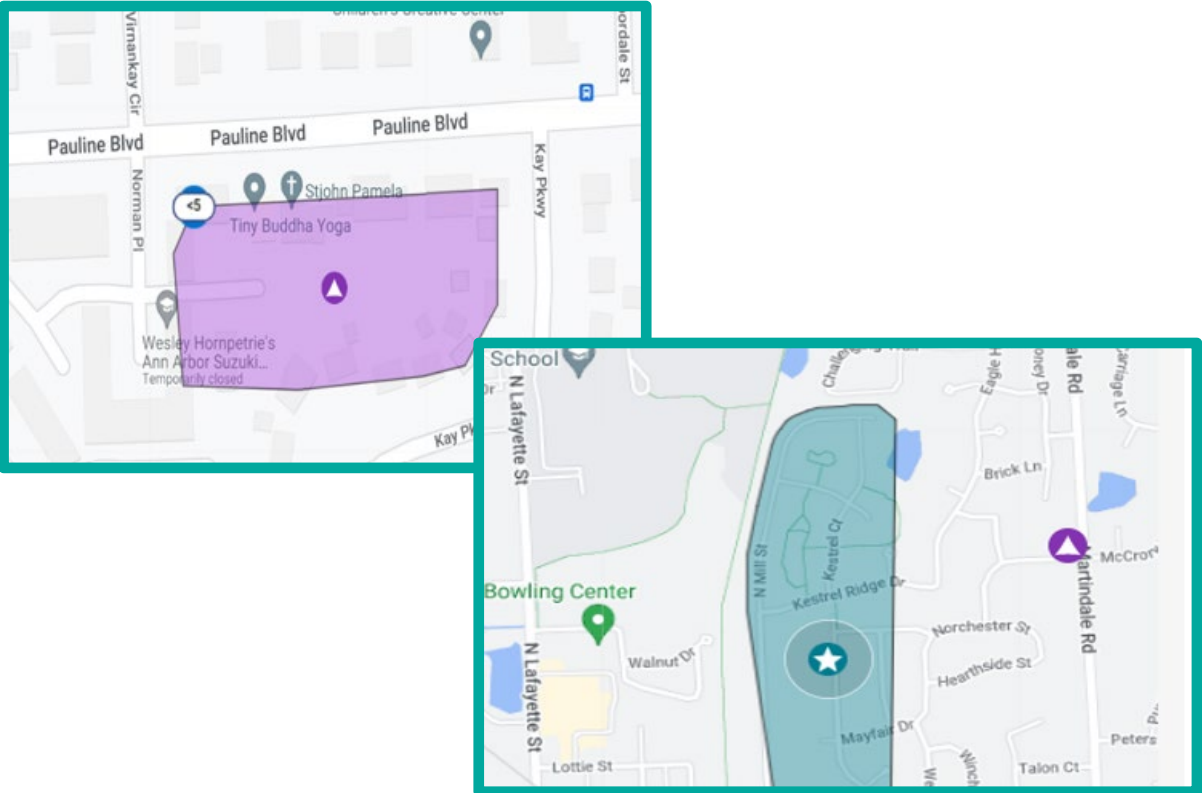
Category	Data Quality Scenarios		
Source Data Issues	Incorrect Source Data	Multiple Customer Addresses	Incorrect Lat/Long Data
Data Issues Generated By Faulty Business Logic	Outage Status Updates	Event Data Mismatches	"Trouble Behind Trouble"
System/ Equipment	Faulty AMI Metering Indicators	System Outages	Scalability



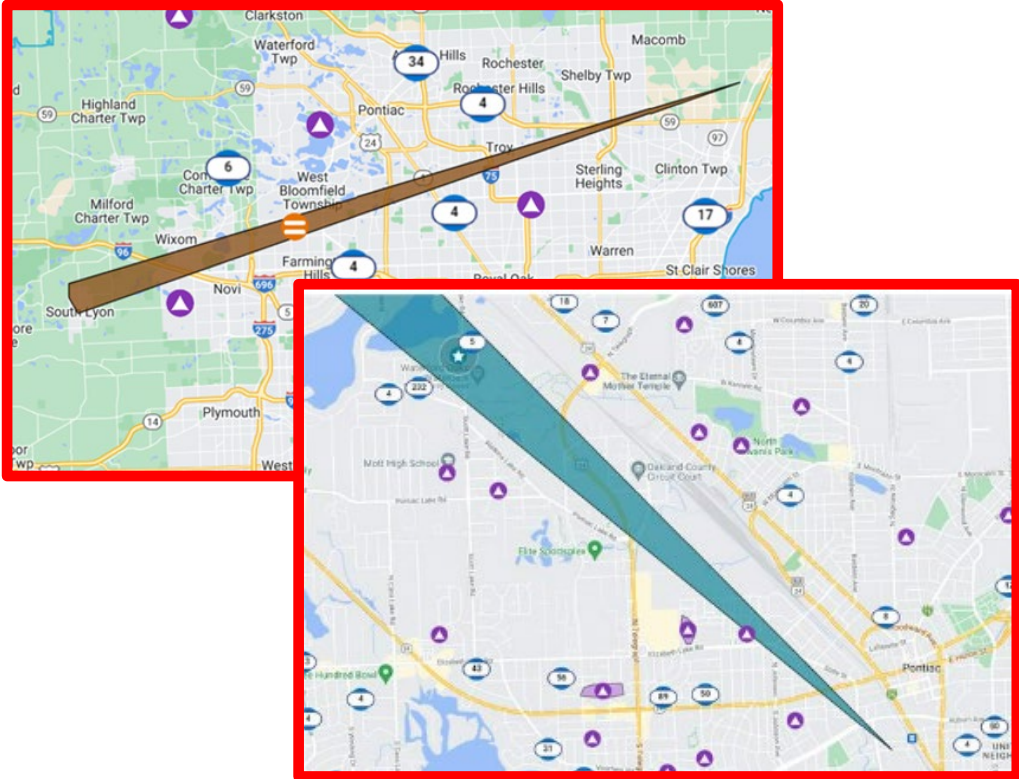
Outage Map Data Quality Problems

Pre-production testing identified thousands of “needles, daggers, darts, arrows thru my heart, etc.” on the map, signifying mismatched Lat/Long data for specific customer locations and meter/transformer data...

Polygons = **Good**



Needles = **Bad**





Outage Map Data Quality Resolution

- Intuitive data mining techniques identified data quality issues on the outage map. For example, calculating the distance between the customer address (“premise”) and its associated transformer.
- Using Alteryx, several address consistency workflows were developed to identify problems
- Developed several dashboards to document the findings:

Created date: 1/24/2023 - 2/27/2023

Premise: All | JobID: All | DisplayJobID: All

1
Predicted Jobs Count

1,407
Predicted Premises Count

JobID	Outlier Distance	Outlier Premise	Premises Count	Outlier Address
63f6cbccf2064022994bbdbd	207.88	5113472412	1,407	30771 MILFORD RD NEW HUDSON, MI 48165
63f6d01ff2064022995adde0	162.55	5113475846	814	3450 US 23 ANN ARBOR, MI 48104
63f89e163197806259f695ea	120.42	5200005561	25	603 STONEBRIDGE CT GRANDVILLE, MI 49418
63f716edf206402299bac99e	120.24	5200005561	1,706	603 STONEBRIDGE CT GRANDVILLE, MI 49418
63f6c30bf206402299329682	120.23	5200005561	1,426	603 STONEBRIDGE CT GRANDVILLE, MI 49418
63f7038cf206402299af47a3	106.49	5110051183	475	7705 RAPSON RD HARBOR BEACH, MI 48441
63f6a0e3f20640229903d70b	106.36	5110051183	152	7705 RAPSON RD HARBOR BEACH, MI 48441
63f69c41f206402299ff8a39	86.02	5200125078	5,169	9817 WHISPERING PNES PIGEON, MI 48755
63f6dd69f20640229984a2f5	86.02	5200125078	5,169	9817 WHISPERING PNES PIGEON, MI 48755
63f6e67cf20640229998d580	85.12	5113279977	1,932	32 THOMPSON RD BAD AXE, MI 48413
63f68345f206402299f401bc	82.72	5111154042	225	1100 EISENHOWER PL ANN ARBOR, MI 48108
Total			938,254	

Premise: 5110951638 | Address: 1 KENSINGTON NORTH ST NEW HUDSON, MI 48165 | LAT: 42.5136657

Premise: 5110558295 | Address: 10 KENSINGTON NORTH ST NEW HUDSON, MI 48165 | LAT: 42.5136413

Premises	CallCodes	Call Code
Jobs	JobID: 63f6cbccf2064022994bbdbd CallCodes: 3	Call Code: AML_XCURR, ONELEG, XCURR
Enr_Status		
CallCodes		

The map illustrates a significant data quality issue. A red box highlights a 'premise' (star icon) located in New Hudson, MI. Another red box highlights an 'associated transformer' (star icon) located in Ann Arbor, MI. A dashed red arrow indicates a distance of 97 miles between the two locations. A blue callout bubble points to the premise with the text '“Needle” Scenario*'. The map shows major roads like I-75, I-94, and I-69, and cities like Lansing, Flint, and Detroit.

**Ultimately resolved through Google Maps address cleansing API integration*



- Local analytics & automation consulting group, since 1996
- Long-time partner at DTE
- End-to-end expertise in dashboards, data quality management, and automated testing



- Global leader in analytics automation & data blending
- Primarily used to identify and remediate data quality and business logic issues



- Cloud DevOps architecture and API backbone
- Power BI data visualization



- Global leader robotic process automation & software testing tools
- Automated test case management & regression test suite

Thank You!



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