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BUILDING A BETTER SOFTWARE BASE FOR METER SERVICES

*Monday, October 2, 2023
11:00 am*

Presented by Tom Lawton
TESCO – The Eastern Specialty Company





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SOFTWARE AS A TOOL

Software is no different than any other tool or process we have at our disposal, but it has the power to provide exponential returns by leveraging the data we know best. The more we know about how these tools help us, the better we can bring them to bear on existing problems and issues and future problems and issues. At Tesco, we're doubling down on software.





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TESCO'S VISION

A series of platforms that have all of the information we need to make the best-informed decisions for operations and infrastructure development.





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TESCO'S VISION

Having access to and analyzing data from

- Assets
- Customer Usage
- Testing
- AMI non-billing site data

Creating routine work tickets to correct and improve the distribution system



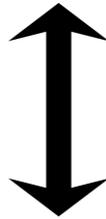


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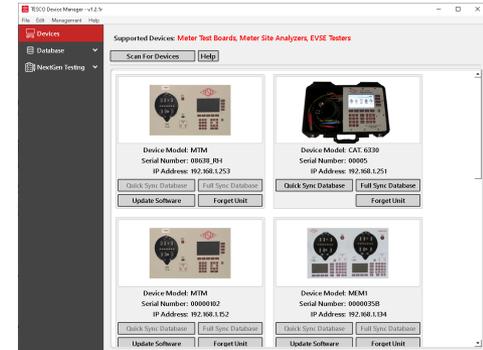
USING THIS MODEL FOR OURSELVES



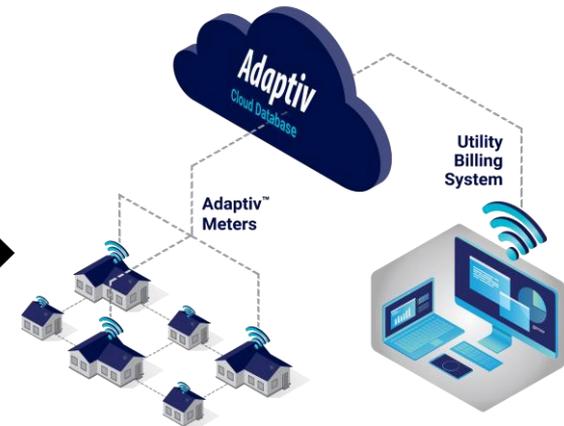
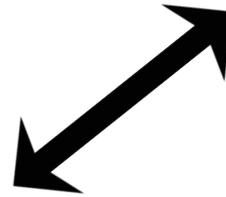
Site Asset Data from your Inventory,
Asset Management, ERP systems



Unified Digital Platform
For Analytics, Automation and AI



Testing Data via TESCO
Device Manager (TDM)



Usage Data from your AMI system



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METER MANAGER



THE EASTERN SPECIALTY COMPANY



METER MANAGER



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ADD VALUE THROUGHOUT THE AMI PORTFOLIO

Architected with touchpoints to efficiently process core information



Smart Meter / Module



Third Party Installer



Work Management



AMI Head End System (HES)



Meter Data Management (MDMS)



Customer Info System (CIS)

- ✓ Create devices from manufacturer files
- ✓ Perform acceptance testing, reject failed shipments
- ✓ Create devices in HES, MDMS, and CIS after acceptance

- ✓ Interface to communicate location changes, and the movement of shipment and sample batches
- ✓ Notification to release devices into stocked status

- ✓ Track devices down to the person/truck level
- ✓ Cross check meter installations against meter assignments
- ✓ Track removed meters back to the shop
- ✓ Equipment kits for CT/VT installations

- ✓ Maintain consistency between HES and CIS
- ✓ Find installed meters not on HES
- ✓ Find meters on HES not shown as installed
- ✓ Two-way update of program and firmware version

- ✓ Program ID OTA updates are automatically communicated and any changes to billing K are made
- ✓ MDMS billing multiplier can be cross-checked

- ✓ Calculates billing multiplier for cross-checking against CIS
- ✓ Can optionally be the system of record for device attributes, supply to other systems



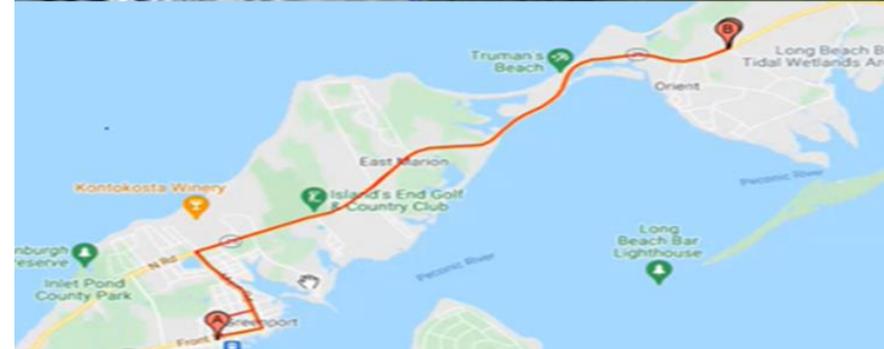
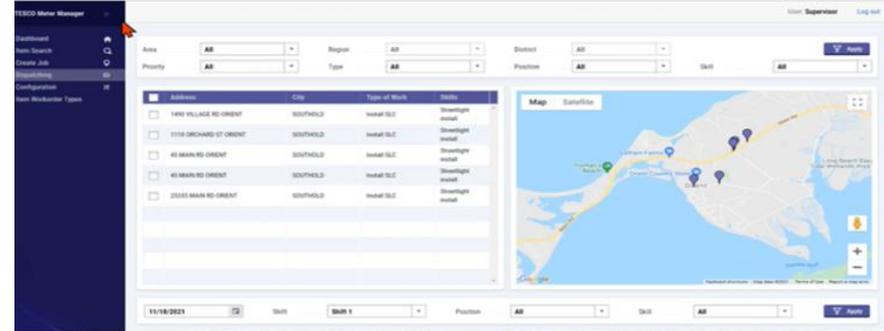
60% of Customers have SAP
 25% of Customers have Oracle
 15% of Customers have legacy/other CIS



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METERING-CENTRIC FIELD SERVICE MANAGEMENT

- ✓ Skills based work order assignment
- ✓ Configurable tasks for each work order and/or equipment type
- ✓ Schedule a technician on-the-fly and instantly notify and update their schedule for re-routing
- ✓ Optimized routing that recommends the best and safest route for any location with the effort to complete work order (complex / simple) factored into the schedule
- ✓ Works standalone and when network available reconnects automatically and syncs data
- ✓ Increase field work's accuracy and efficiency through GPS





BUILT IN INTELLIGENCE WITH REAL-TIME INFORMATION

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SCAN NEW METER
Serial # 090737515

ENTER OLD METER READ
Right-to-left entry mode

9 8
7 8
4 5
1 2
0 C

Old Meter
Serial Number: 095160521
Model: S4X/16S/E - 069
Customer Name: NORTH SHORE COMM SVC
Customer #: 8046652803
Premise: 80466528077181
Address: 14 SHORE LA , BAY SHORE , New York, 11706
Read: 98765

Next

7
4
1
0 C

WARNING

- Device #090737515 was not checked out to Supervisor
Mismatched fields:
Form (old meter: 16S, new meter 2S)
Voltage (old meter: 120, new meter 240)

Continue Cancel

Old Meter	New Meter
Serial Number: 095160521	Serial Number: 090737515
Model: S4X/16S/E - 069	Model: REXU/2S/E - 051
Customer Name: NORTH SHORE COMM SVC	
Customer #: 8046652803	
Premise: 80466528077181	
Address: 14 SHORE LA , BAY SHORE , New York, 11706	
Read: 98765	

Wrong address? Search by Customer #

Old Meter
Serial Number: 095160521
Model: S4X/16S/E - 069
Customer Name: NORTH SHORE COMM SVC
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Premise: 80466528077181
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TESCO DEVICE MANAGER - TDM





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TESCO DEVICE MANAGER (TDM)

LINKING TO THE HARDWARE

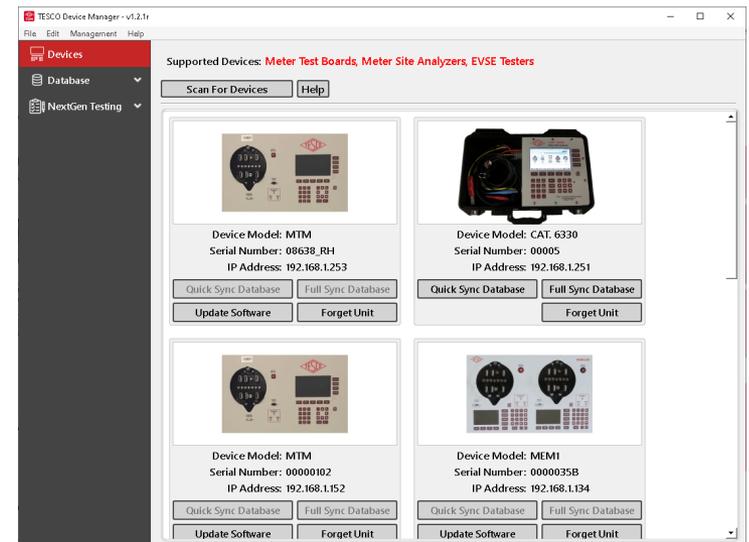


Software is a tool. This tool needs to be easy to use and intuitive to understand. All Microsoft products have a look and a feel that tells you they are Microsoft products. If you can navigate in one you can generally navigate in another.

We are working hard at TESCO to do the same across all of our platforms. TDM has been developed to bring efficiency to the meter shop by using the same platform to control all TESCO lab equipment, shop equipment and field equipment.

Features include:

- Direct to PDF reporting
- Report customization with company logo
- CSV data exporting
- Ability to simultaneously extract data from multiple units
- Ability to import data from any test equipment into any other software tool for analysis
- Ability to simultaneously update multiple units





TESCO TDM WITH METER MANAGER





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USING TDM TO AUTOMATE AND STREAMLINE

TDM can create test sequences to automate tasks and reduce wasted effort;

For Standard As Found and As Left Tests

- Create sequences for standard forms
- Link with Meter Manager to automatically set up for any individual meter or other device being accuracy or functionally tested
- Do the same for Instrument transformers or anything else that you are using TDM to test

For First Article Testing

- Create a sequence for every functional and accuracy test you want to run and ensure that every new type of meter or iteration of a new type of meter are tested in a consistent manner with far less manual intervention.

For Sample Testing

- Create an automated sequence for sample testing of any meter and soon for any instrument transformer or even electric vehicle charger

Being able to create these sequences allows the meter engineer or the meter tech the ability to ensure consistent testing while also removing a significant amount of unnecessary labor





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NIGHTHAWK



A TESCO COMPANY



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NIGHTHAWK

About Nighthawk

- Nearly 30 years of utility experience
- 100+ utilities served

About Adaptiv™

- Unique zero-infrastructure network
- Cellular + Mesh Communications
 - Verizon LTE
 - AT&T
- **Ideal for either incremental or rapid deployment**
- Lowest total cost of ownership in the industry

Nighthawk is a
TESCO company.



THE EASTERN SPECIALTY COMPANY

- TESCO (The Eastern Specialty Company) is a manufacturer and service provider to the meter industry owned by, run by, and staffed by engineers.
- Headquartered in Bristol, PA
- Founded in 1904
- Uniquely qualified to support MUB



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NIGHTHAWK

Adaptiv

Home | Help | Logout

Dashboard

Map

Electric Outage

Map Satellite

5024 29TH ST W MN

Status: Outage
Customer No: 1228
Serial No: JG10221850006770
Meter No: J06078

Show Customer Meter Data

Billing Status

Bill Cycle	Next Read Date	Missed
01	04/30/2020	2
02	04/30/2020	0
03	04/30/2020	0
04	04/30/2020	0

Alert Details

- 3 Non Reporting
- 2 Outage
- 1 Usage on Inactive

Smart billing integration with secure mobile access



Over-the-air configuration and upgrades on all Adaptiv™ maps

Utility Billing System



Adaptiv

Dashboard

Map

Electric Outage

Map Satellite

5132 29TH ST W MN

Status: Outage
Customer No: 1228
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Billing Status

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Alert Details



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COMMUNICATION NETWORK AND CYBER SECURITY

DirectConnect

- Compatible with all data acquisition software that supports TCP/IP connections





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UNIFIED DIGITAL PLATFORM



AI



Analytics



Tesco Digital Platform



Automation



TESCO ANALYTICS



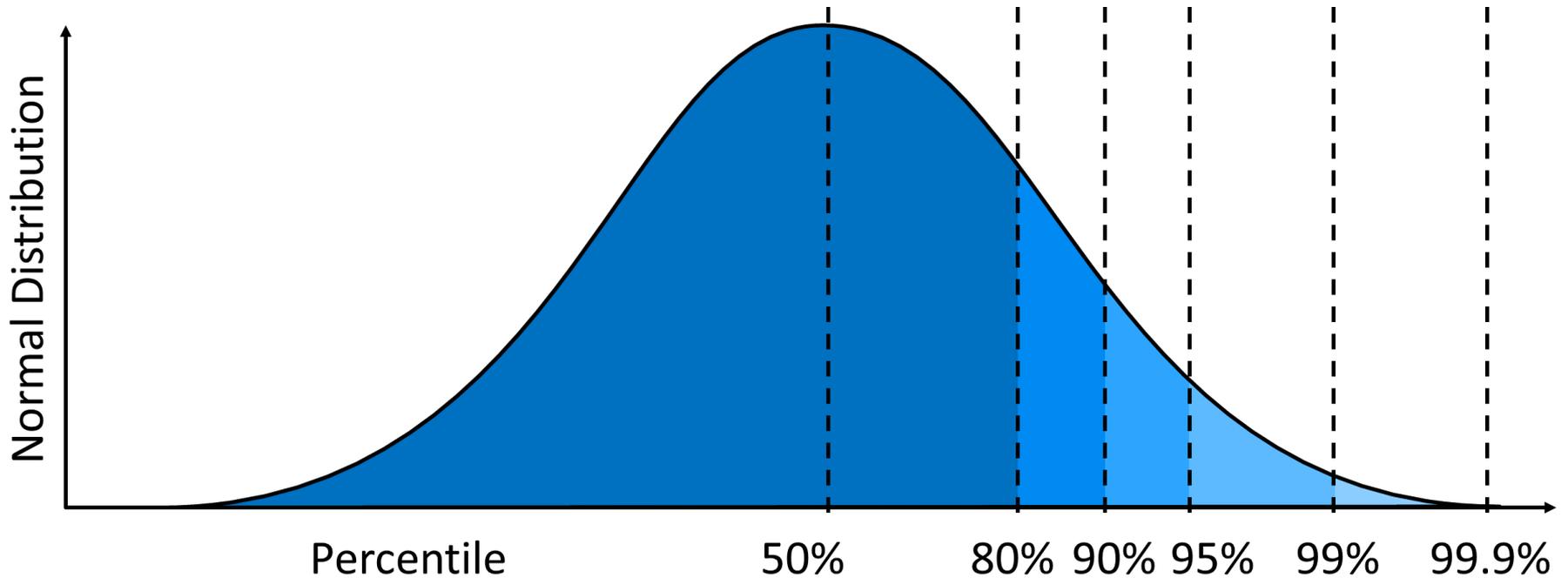


$$P(A) = \frac{\# \text{ outcomes in event } A}{\text{total } \# \text{ of outcomes}}$$

1. Average, mean, mode, median
2. Do this a lot = long run frequency

We do this in Real Time using “Big Data” from all of our sources

SIGNIFICANCE AND TESTING



Now let's look at a few examples of how we use this data to
Operational Advantage



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Oversized Transformer Reporting

Platforms used:

Meter Manager – has all physical assets at every location including the instrument transformers

Consumption information from the head end – in this case a Silver Spring/Open Way head end



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Oversized Transformer Reporting

Output:

A monthly report of the most egregiously over-sized transformer installations with usage going back over the past two years to demonstrate and estimate lost revenue

Use:

Field services receives monthly work orders to replace the instrument transformers with appropriately sized transformers. Extended range transformers further improve the effectiveness of the monthly billing





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A FEW CASE STUDIES ON HOW TO USE DATA ACROSS PLATFORMS

Oversized Transformer Reporting

Results:

A steady increase in monthly revenue gains on every Commercial/Industrial account addressed. Payback for the work is under three months in every case as there are so many oversized accounts.





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Oversized transformer reporting

Results:

Safety hazards found in the field were initially anticipated to be only failed socket jaw (hot socket) events, but this proved to be only a fraction of what was found. Some of the various safety related issues discovered in the field include;

- Failed meter socket jaw
- Frayed and breaking weather head connections
- Arcing on a customer circuit on the customer side of the service panel in the home
- Arcing at the connection to the Distribution transformers closest to the house
- Arcing in the manual disconnect mechanism of the meter box
- Frayed and failing wires between the socket and the service panel in the home



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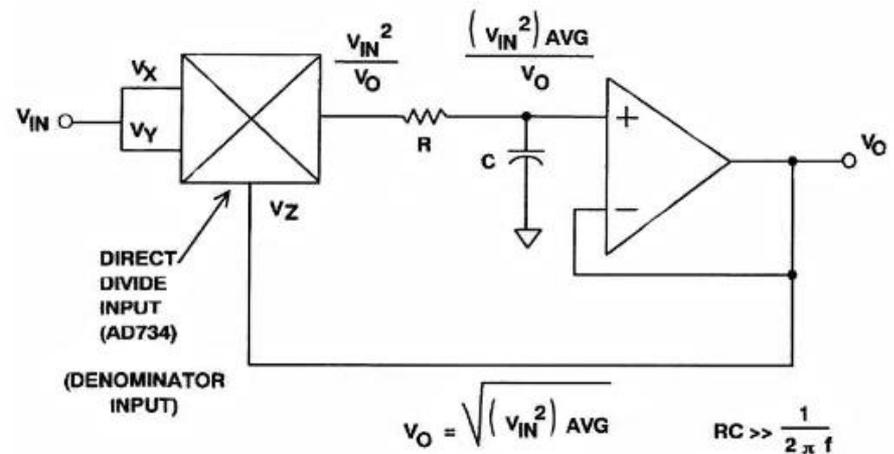
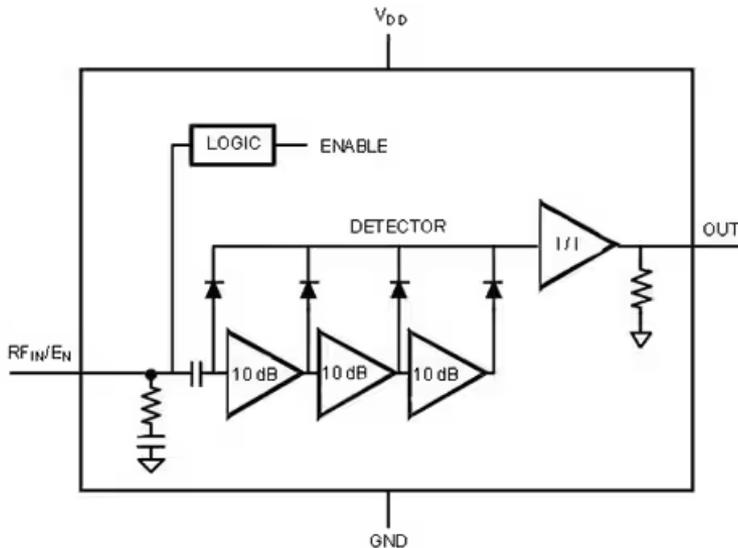
A FEW CASE STUDIES ON HOW TO USE DATA ACROSS PLATFORMS

RF Detection Alarms

Platforms used:

Itron Open Way head-end and L+G Gridstream head-end – receive alarm data on the RF signature of electrical arcs in or around the service

TESCO Analytic software – over-arching customized analysis software to work across a variety of platforms





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A FEW CASE STUDIES ON HOW TO USE DATA ACROSS PLATFORMS

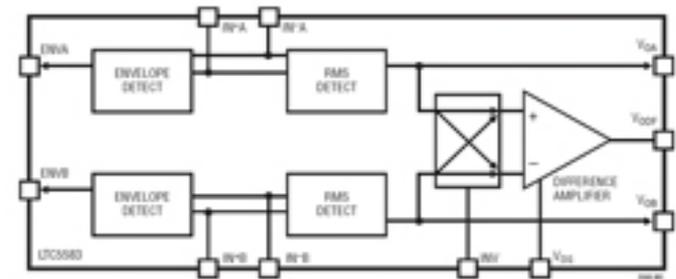
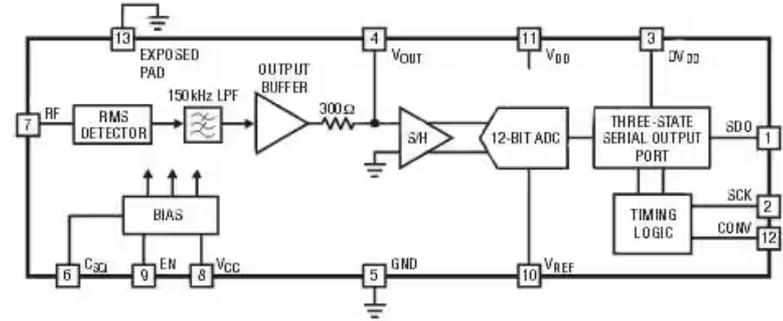
RF Detection Alarms

Output:

A weekly report identifying sites with RF detect (micro arc) alarms that fit an identified pattern

Use:

Field services receives a weekly report of sites to check for safety related issues. Inspection involves a visual detection as well as the use of RF detection equipment to pinpoint the source of the problem.



RADAR ENGINEERS



MODEL M331 MINI RFI LOCATOR



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NEXT GENERATION ANALYTICS

Consumption Analysis: Combine data from Tesco Meter Manager and Nighthawk AMI to analyze consumption patterns of utility services such as water, gas, or electricity. Utilities can identify high consumption areas, detect anomalies, and offer energy-saving recommendations to customers.

Demand Forecasting: Use historical consumption data from Nighthawk AMI and Tesco Meter Manager to predict future demand patterns. Accurate demand forecasting helps utilities plan their resources more efficiently, avoiding overcapacity or shortages.

Leak Detection: By analyzing data from both systems, utilities can detect water or gas leaks in the distribution network. Early detection of leaks allows utilities to reduce water waste, prevent potential accidents, and minimize repair costs.

Asset Performance Management: Combine asset data from Tesco Meter Manager with usage data from Nighthawk AMI to assess the health and performance of utility assets. This analysis can aid in predictive maintenance, reducing downtime, and extending the lifespan of infrastructure.

Customer Segmentation: Analyze customer data from Tesco Meter Manager and usage patterns from Nighthawk AMI to segment customers based on consumption behavior. Utilities can tailor their services and marketing strategies to specific customer segments.

Load Profiling: Create load profiles by analyzing data from Nighthawk AMI and Tesco Meter Manager. Load profiling helps utilities understand peak demand periods, plan capacity, and optimize energy distribution.

Revenue Assurance: Integrate billing data from Tesco Meter Manager and usage data from Nighthawk AMI to identify discrepancies and reduce revenue losses due to metering errors or inaccurate billing.

Operational Efficiency Analysis: Analyze data from both systems to evaluate the efficiency of utility operations. Identify areas where processes can be streamlined, resources optimized, and costs reduced.

Outage Management: By combining data from Tesco Meter Manager and Nighthawk AMI, utilities can improve outage detection and management. They can quickly identify affected areas, estimate restoration times, and communicate more effectively with customers during outages.

Environmental Impact Assessment: Analyze consumption data from Nighthawk AMI and Tesco Meter Manager to assess the environmental impact of utility services. Utilities can monitor their carbon footprint, set sustainability goals, and implement initiatives to reduce environmental impact.



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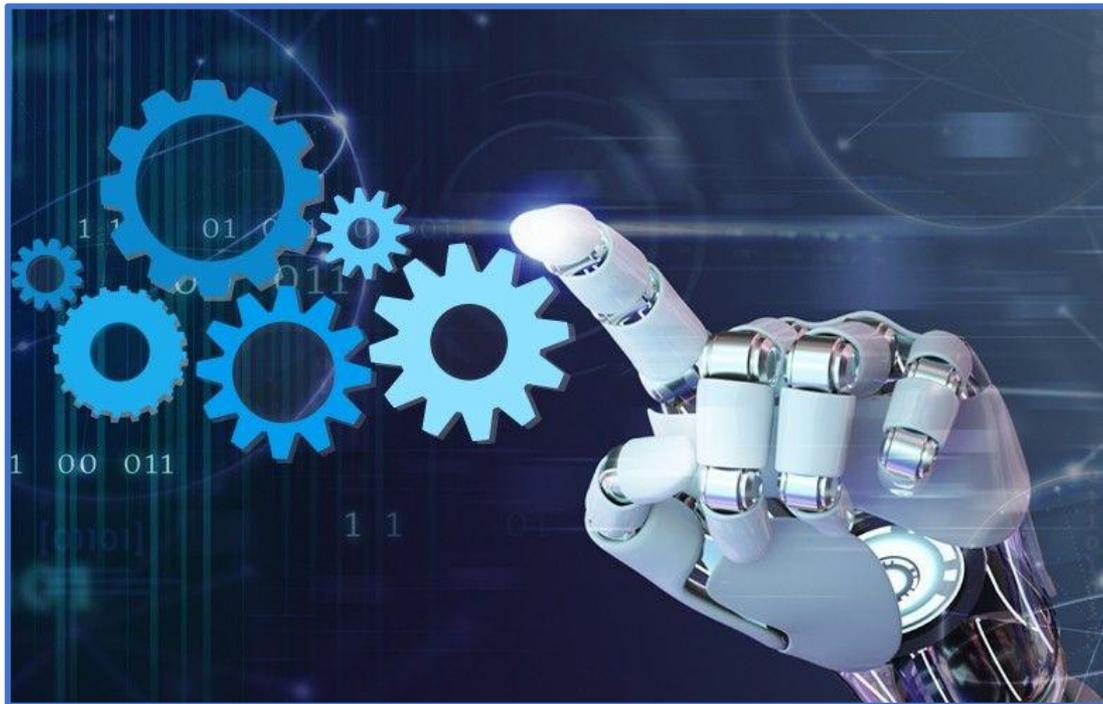
ARTIFICIAL INTELLIGENCE



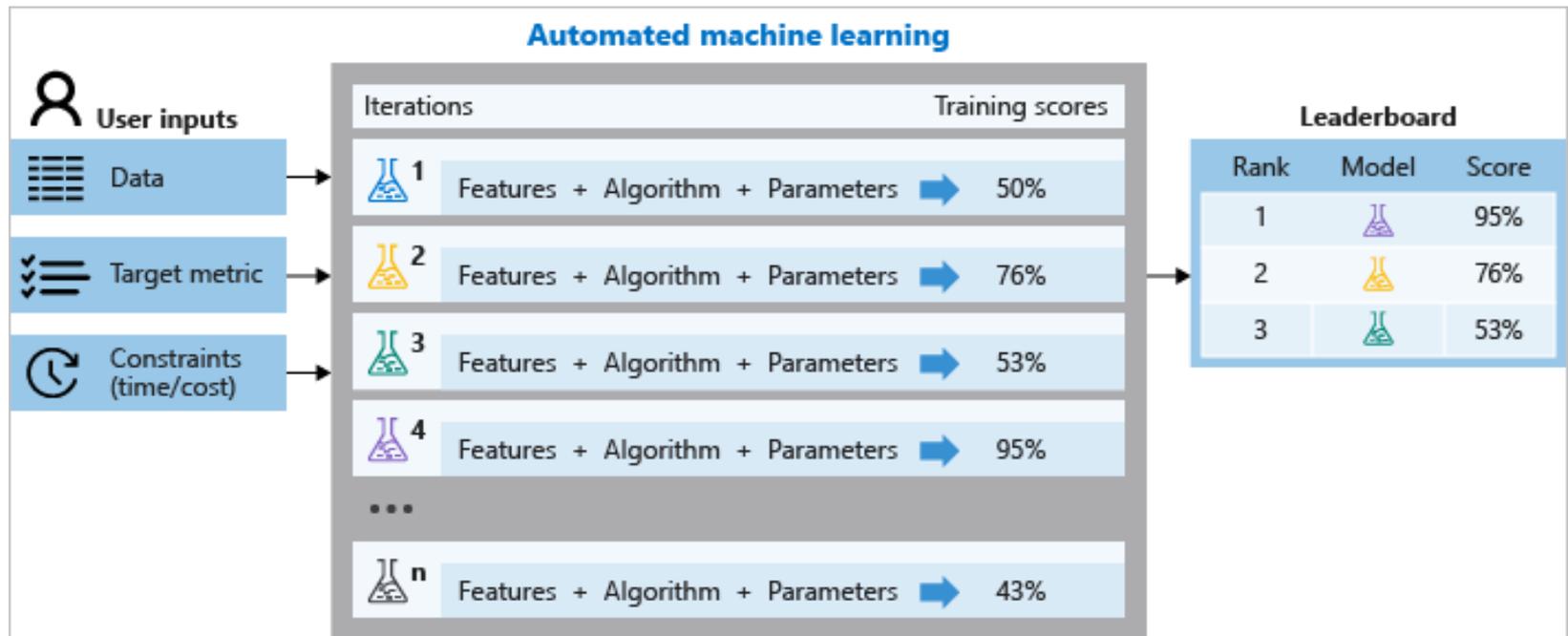
AI provides the ability to make informed decisions automatically. By using big data in real time, we can augment and make the right decision, better, faster and cheaper, e.g. which alarms become actionable which data become actionable.

Data Engineering

- Structure, semi-structure, unstructured data
- Integration, consolidation, cleansing, transformation
- Operational and analytical data, streaming data, live data
- Data pipelines, data lakes, data warehouses

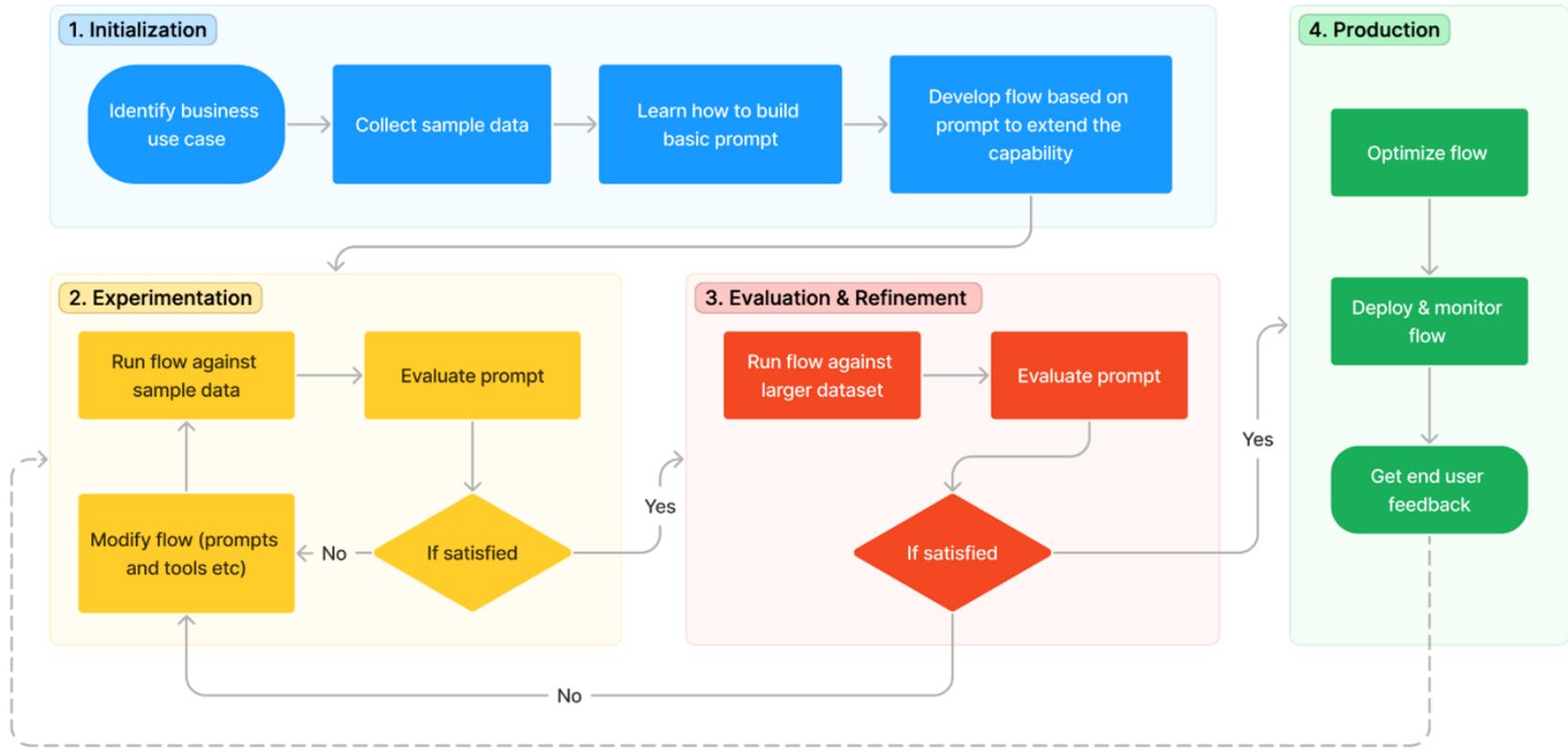


AUTOMATED MACHINE LEARNING





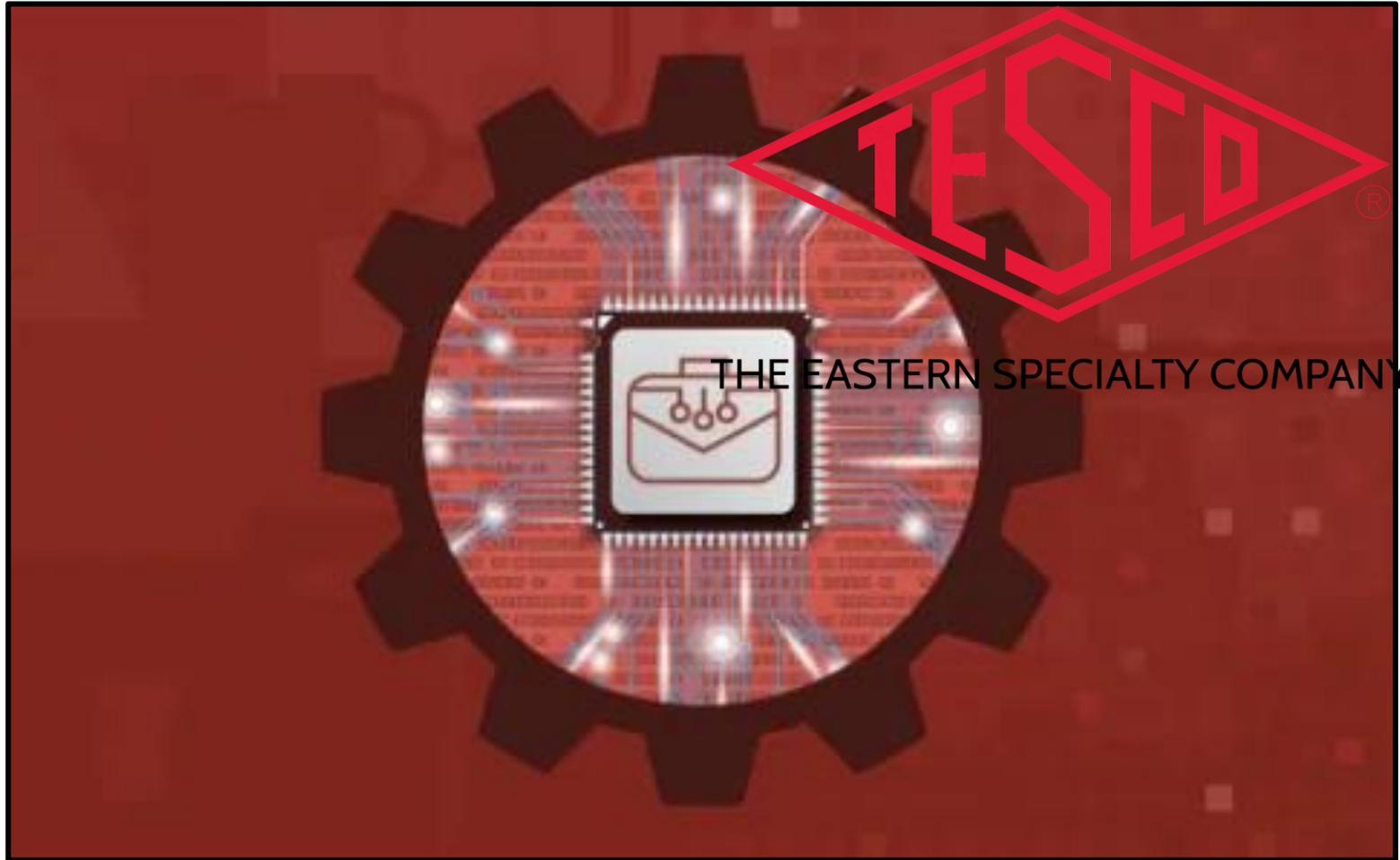
REPRESENTATIVE MACHINE LEARNING PROCESS MAP





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AUTOMATION



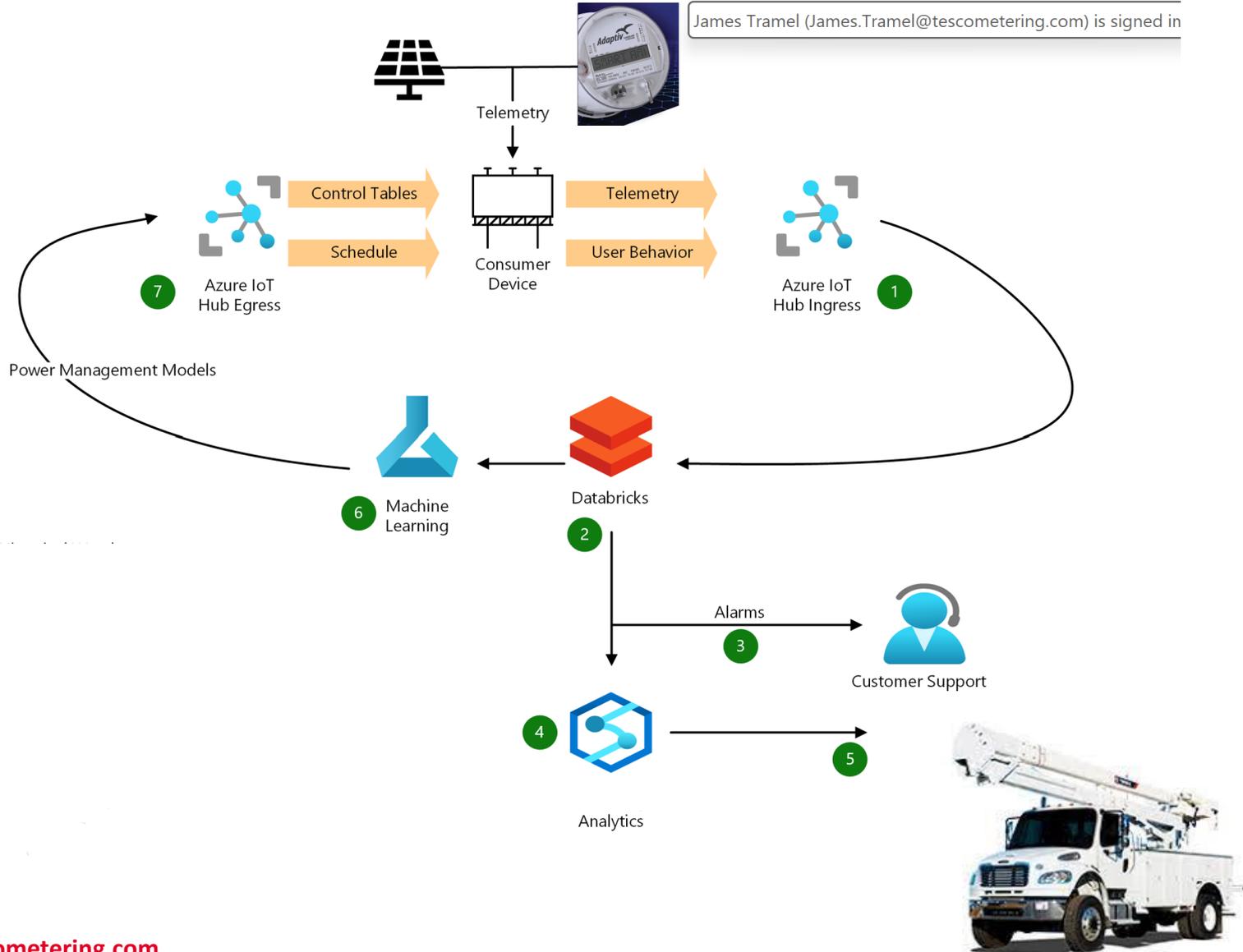
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AI & AUTOMATION EXAMPLE - PREDICTIVE MAINTENANCE

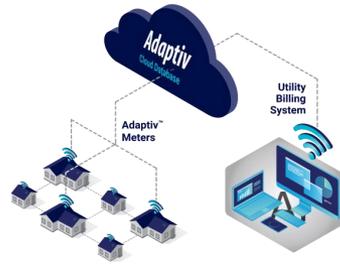
James Tramel (James.Tramel@tescometering.com) is signed in



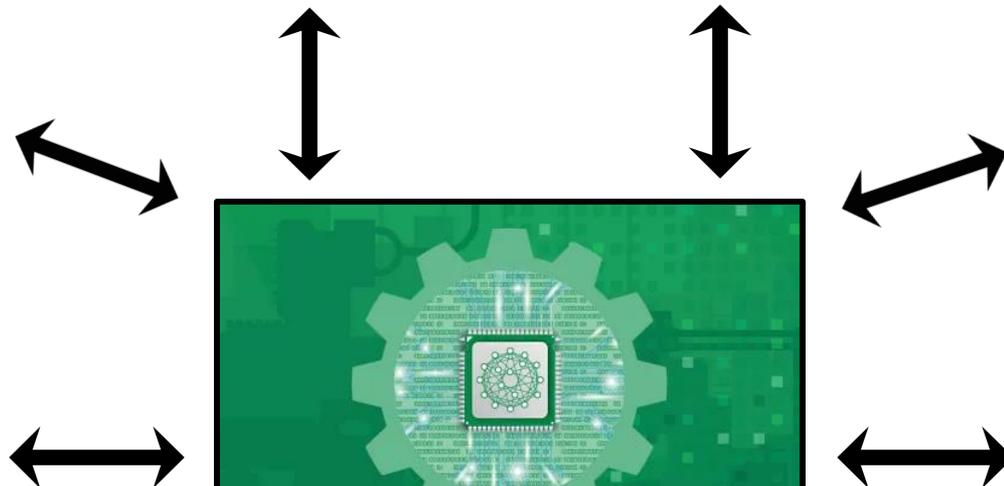
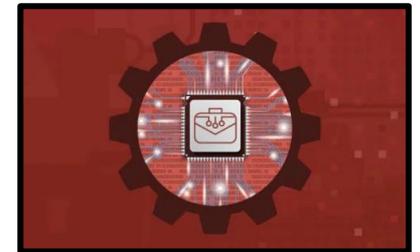
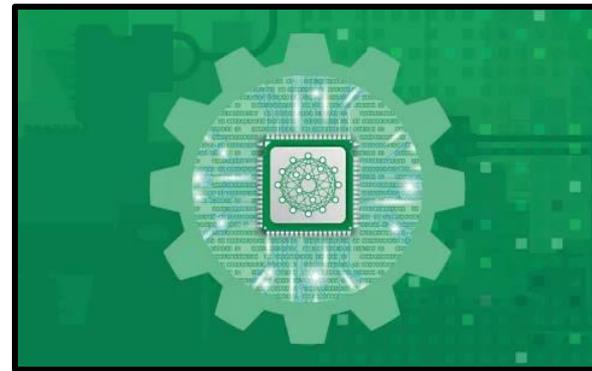
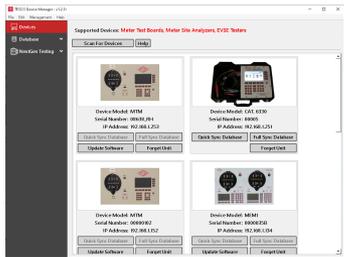


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TESCO DIGITAL PLATFORM



Meter Manager





Meter Manager + TDM + NightHawk

- Meter manager
 - System of record, inventory, ERP
- Adaptiv/ Nighthawk
 - Transactional, always on service
- TDM
 - State based, on demand service
- Bring your own systems to integrate with all or part of the platform
- Integrate what you need, when you need it
- Get the insights you need, when you need it

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