Modernize Distribution Performance All the Way to the Grid Edge

Oracle Utilities Network Management System
Distribution is evolving. Are you?

Exceptional reliability is now expected, and it needs to be delivered at a lower cost.

Historic-level storms are leading regulators to demand improved outage management.

Consumers are adding interconnected devices to the grid at a staggering rate, increasing the need for exceptional management of high-volume data.

Competition and consumer technology innovation are pressuring utilities to create new ways to deliver value and generate revenue.

Rooftop solar and other distributed energy resources are growing much faster than expected.

Legislation is aggressively supporting new distribution models that put consumers—not utilities—firmly in charge of consumption.

In a 2014 executive survey by PricewaterhouseCoopers, 80% of utility CEOs said that they see their business changing radically over the next five years. Only 20% of utilities have launched the programs and projects they’ll need in order to perform effectively and successfully in the market that will exist five years from now. How prepared are you?
Unleash the Value of a Modern Distribution Grid

**Oracle Utilities Network Management System** (Oracle Utilities NMS) is an advanced distribution solution that combines world-class data management, predictive load and outage profiling, proven scalability, and grid optimization and automation to improve business performance and customer satisfaction.

With it, utilities can tie customer and operational processes together to meet demand at the lowest cost possible, deliver outage responsiveness needed to build regulatory and customer trust, and turn the challenges of a changing distribution grid into business opportunity.

Consisting of Oracle Utilities Distribution Management and Oracle Utilities Outage Management systems on a unified model platform, Oracle Utilities NMS enables utilities to realize powerful benefits:

- Bring new thinking to monitoring, control, and optimization of the grid to improve how you can safely meet demand at a lower cost
- Use the variability of distributed energy resources as a way to improve reliability
- When things do go wrong, more effectively respond to unplanned outages, integrate emergency and mutual-aid crews, and get accurate information to customers faster

Also, Oracle Utilities NMS is part of a complete suite of grid solutions. Via pre-integration and cloud services, these solutions deliver the industry’s most comprehensive network management capabilities that extend to the edge of the grid and into the customer premises.
Monitor, Control, and Optimize the Entire Distribution Grid

Traditional grid systems weren’t built for the level of data-driven, complex processes needed for modern distribution management. Oracle Utilities NMS is purpose-built to support a modern utility, providing a data-centric approach to monitoring, control, and optimization of both traditional distribution and edge-of-grid needs.

Fig. 1: Support the traditional utility model while evolving your operations and systems to meet new distribution requirements

Dynamic Tools Deliver Lower-cost Reliability, Safety, and Productivity

To specifically address today’s utility challenges, Oracle Utilities Network Management System delivers advanced distribution management tools, including real-time network status updates, field device monitoring and control, switching planning and management, load profiling, and much more. With it, utilities can optimize power flow and lessen emissions to provide the most reliable, cost-effective, safe, and secure distribution grid. Oracle Utilities NMS does so by:

- Improving network health by continuously analyzing data across multiple systems and reporting risk
- Reducing the cost of demand by automating voltage regulation and electricity conservation
- Accelerating control room productivity through training, simulation, and best practices
- Providing safe and fast maintenance, network reconfiguration, automated self-healing, and outage restoration through coordinated and accurate switching, both in planning and real-time

The Industry’s Most Forward-thinking Way to Evolve Your Distribution SCADA

Traditional SCADA was built for a rigid operating environment, not the level of data-driven processes required for modern distribution. As a result, utilities need to modernize their approaches to distribution SCADA.

We’ve combined our proven ability to innovate with our deep industry experience to produce the most forward-thinking approach to distribution SCADA. We begin by examining your operations and process. We then walk you through options and guide you to the solution that best positions you to evolve distribution SCADA to address current and future needs. Options include:

- Supplementing distribution field SCADA with a modern, scalable, and real-time SCADA that is web deployable, cross-platform compatible, simple to use, and, unlike your existing SCADA/EMS, allows for exponential growth of distribution field devices
- Supporting your existing SCADA, AMI, or GIS investments via pre-built adapters while also expanding your management, automation and optimization capabilities to the grid edge
- Extending your DMS/SCADA down into distribution while maintaining security for compliance, such as NERC CIP requirements. The operator still maintains full control while gaining powerful benefits delivered by a suite of ADMS tools, including FLISR, Volt/ VAR, CVR, suggested switching, study mode, and more.
Apply Proactive Management to Distributed Energy Resources to Reduce Intermittency Risk

Empowered by technology innovation and supported by policy, consumers are choosing to adopt distributed energy resources (DER) in record numbers and far faster than anticipated. By managing their energy consumption behavior with little or no input from utilities, consumers are changing how the modern distribution grid works. One key change is that DER are pushing massive amounts of real-time data back onto the distribution grid. Without effective DER data and device management, reliability and service quality are at risk.

<table>
<thead>
<tr>
<th>Year Estimated</th>
<th>Year Growth Expected</th>
<th>Actual Year Achieved</th>
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</thead>
<tbody>
<tr>
<td>2006</td>
<td>2030</td>
<td>2012</td>
</tr>
<tr>
<td>2012</td>
<td>2020</td>
<td>2014</td>
</tr>
</tbody>
</table>

Fig. 2: The continued and unprecedented growth of solar is accelerating distribution change more rapidly than expected

Source: International Energy Agency (IEA)

Improve Planning and Risk Management for Distributed Energy

As consumers connect more distributed energy resources into the grid, their intermittency creates real risk to reliability and grid health. While utilities can’t control how or when these resources are connected, they can use Oracle Utilities NMS and Oracle DataRaker to reduce the risks they pose.

Oracle Utilities NMS enables utilities to model the load profile of each and every distributed energy resource, accounting for location, condition of use, and other attributes unique to an asset. Oracle DataRaker then creates risk models from sample data of customer DER records and specific class models. Oracle Utilities NMS applies that model to the DER population to reduce risk—in real time and continuously. Business planning and health improve from:

- Reducing asset failure by identifying and managing negative performance patterns
- Incorporating DER, community, and economic data into load forecasting
Profile Load by Location and Condition of Use

Oracle Utilities NMS enables utilities to model the load profile of each and every distributed energy resource, accounting for location, condition of use, and other attributes unique to an asset. For example, when looking at each rooftop solar resource, you can account for clear and cloudy skies, latitude, time of day, day of the year, and direction and pitch of the panels.

Should you need to keep the investment you have made in your distribution and outage management system, Oracle Utilities Distributed Energy Resource Management Solution (DERMS) can integrate into your existing capabilities. In doing so, it provides complete control of DER, delivering grid-edge optimization, demand side management, load shifting, and reliability planning intelligence. Oracle Utilities DERMS can also serve as a platform for distributed energy services, capable of connecting business processes from the network model through the CIS.

By more accurately modeling load profiles and forecasting where and how DER growth will impact the grid, utilities can realize a number of mission-critical benefits, including:

• Reducing the capacity for intermittency to cause disruption and safety issues
• Eliminating the need to bring additional, costly generation resources online
• Minimizing customer minutes of interruption (CMI) via improved load profiling
• Improving views of how growth will affect capacity or spur the need for investment and work

Key Features

• Load profiling by DER type, location, and condition of use
• Out-of-the-box load models for storage, solar, and more
• Automate monitoring and control of high-volume data field devices
• Internet Protocol-based (IP) communication enables exponential growth of connected grid devices
• Exception-based management simplifies integration of distributed data
• Priority-driven management ensures trouble spots and alarms are identified, flagged, and elevated
• Communication down to the customer device improves overall network performance

Fig. 3: Profile distributed energy resources by type and location for more intelligent and effective load forecasting
Proven and Scalable Outage Performance Improves Responsiveness and Communication to Customers

Unplanned outage management is where Oracle’s leadership is well known. Oracle Utilities NMS provides scalable, best-in-class performance proven under the harshest conditions across the globe.

Comprehensive outage management capabilities ensure you are able to provide the most immediate and effective support during unplanned events—pre-storm predictive outage modeling prepares you for the impact of scenarios; call grouping analytics precisely identifies outage location; data is automatically captured to report on each customer affected; and the system tracks work status and timestamps for accurate reporting.

![Outage lasting > 1 hour](image)

$500 per person

$150 billion

Fig. 4: The economic cost of U.S. power outages of longer duration have increased steadily for the past decade.

Source: DOE International Grid Reliability Report

Build a Real-time Bridge to Each Customer

Oracle Utilities NMS tightly connects customer, grid, repair, and meter processes—and their real-time data—to improve the accuracy and efficiency of response to outages and the speed of communication to affected customers. For each instance, Oracle Utilities NMS manages input from the control room, field crews, and customer service. It then analyzes the results and updates systems and customers—in seconds, not hours. And it does so continuously, so restoration estimates are always accurate.

A single-system view of outage maps, crew locations, and restoration progress provides accurate, real-time status for updates. As well, higher levels of customer satisfaction are achieved via improved engagement tools, such as:

- Reporting service disruption through self-service channels to speed resolution
- Receiving alerts and updates through call, text, or email to broaden the ways customers can stay informed
- Getting service update notifications with the most accurate status so customers gain peace of mind
Improve Restoration by Accelerating Crew Productivity

Oracle Utilities Operations Mobile Application is a self-install, easy-to-use solution that addresses cost, speed, and information accuracy challenges of grid and outage-related field work speed. Utilities can use it to provide any field workers—contractors, mutual aid and loaned crews, and employees—with mobile device access to grid workflow, forms, and information tools on a wide range of mobile devices to ensure:

- Real-time status updates flow from crews to customers more quickly
- Elimination of Idle time of emergency response crews, including mutual aid teams
- Improved reporting to dispatch and back-office systems on non-outage, unplanned events

Out-of-the-box Analysis Provides Actionable Insight

Oracle Utilities Outage Analytics integrate directly into Oracle Utilities NMS, providing pre-built dashboards with graphics that offer fast, easy insight into current and past outages. It enables executive to understand the effects outages have on customers and on utility operations. It helps communications teams convey near real time information to first responders, customers, and the media.

Oracle Utilities Outage Analytics also contains historical outage analyses and comparisons that help utilities spot trends, prioritize changes, and focus efforts on meeting and exceeding reliability goals.

- Speeds and improves the quality of executive-level outage decisions
- Improves communications with first responders, public officials, media, customers, and regulators during and after the crisis
- Slashes time and cost of business intelligence implementations and upgrades
- Minimizes training time

Proven Scalability When You—and Your Customers—Need it Most

Oracle Utilities NMS has proven field performance with our largest customers under historically worst-case conditions. And we continue to benchmark scalability so you’ll never have to worry whether you can handle volumes of data or increased operation complexity. Take a look at our latest results:

<table>
<thead>
<tr>
<th>Supporting</th>
<th>Integrating</th>
<th>Handling</th>
<th>Coordinating</th>
<th>Managing</th>
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<tr>
<td>5.6 million customers with 7300 feeders</td>
<td>500 current operators and more than 300 call-takers</td>
<td>118,000 calls an hour input rate</td>
<td>3700 crew updates</td>
<td>2700 device operations an hour</td>
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Key Features

- Outage profiling and prediction
- Dispatch and tracking
- Call grouping analysis
- Work status and timestamp tracking
- CIS integration and multi-channel communication
- Outage analytics
- Switching tool and study mode
- Mobile application for damage assessment, switching, and dispatch
- Automated and manual model updates using GIS, CAD, and planning system
- Training and scenario planning
Distribution Grid Analytics Continuously Identifies Risk and Improves Performance

Pre-emptively Eliminate Risk and Capacity Constraint

Oracle Utilities NMS manages the convergence of data from enterprise applications such as customer information systems (CIS) and geospatial information systems (GIS) as well as real-time technologies like supervisory control and data acquisition (SCADA) and advanced metering infrastructure (AMI). In doing so, Oracle Utilities NMS serves as a distribution grid analytics platform for Oracle Utilities analytics solutions.

To predict and prevent unforeseen grid risk, Oracle DataRaker aggregates Oracle Utilities NMS and third-party data and delivers powerful cloud-based grid analytics services for continual improvement and risk mitigation. Additionally, Oracle Utilities Analytics provides pre-built dashboards and reporting tools for Oracle Utilities NMS that make it easier to manage, visualize, and share data-driven insight.

Reduce Asset Failure and Network Model Errors

Using the data from Oracle Utilities NMS, Oracle DataRaker can identify unseen correlations between data and asset performance, enabling a utility to pre-emptively avoid failure. For example, using any sensor-based data DataRaker can pinpoint over- and under-utilized assets and create alarms so that failure is proactively prevented. And by continually monitoring voltage data down to the device level, Oracle DataRaker can spot network errors that can often be corrected via automation in Oracle Utilities NMS. You benefit by:

- Preventing stressed assets, such as wind turbines and over loaded transformers, from failing
- Reducing peak loading on feeders with poor load factors
- Identifying equipment inaccuracies in the GIS model

Fig. 5: Oracle DataRaker continually identifies hidden risk and error in the network and asset
A Unified Model Delivers Out-of-the-Box Enterprise Visibility and Value

Oracle Utilities Network Management System employs a common model utilized by both Oracle Utilities Outage Management system and Oracle Utilities Distribution Management system. This unified network model and modular functionality structure provides out-of-the-box, business-centric visibility of the entire smart grid for all outage and distribution functions and enables built-in advanced distribution management. The result is better access to information and more effective decision making, leading to improved reliability and service across the distribution process lifecycle.

The business value of the Oracle NMS real-time, common network model includes:

- Fewer overall resources required to manage restoration operations by leveraging trained DMS/OMS operators
- Reduced outage durations as analysis and resource prioritization are more accurate and timely
- More efficient processes via automation of planned switching
- Increased customer satisfaction due to integrated workflow that provides more accurate restoration time estimates, more timely restorations, and ready access to real-time status updates
- Improved worker safety, due to the real-time accuracy of the model and the built-in integrated operational constraints

Key Features
- Out-of-the-box common model
- Unified modular architecture
- Built-in standards support for ICCP, MultiSpeak, and CIM
- Adjustable user access levels and layouts

Key Benefits
- View and manage the entire smart grid under normal and emergency conditions
- Improve decision making across grid operations
- Create better situational awareness by consolidating multiple sources of information
- More effectively integrate workflow and information needed to improve reliability and service
- Reduce total cost of ownership for comprehensive grid process management
- Ensure straight-forward upgradability across both outage and distribution process

Start with Connectivity Model
- Customer data
- Network connectivity
- Customer to network link

Layer Additional Energy Attributes
- Engineering attributes
- Load models
- Real-time status and analog values from field devices

Perform Optimization Analysis
- Monitor characteristics of energy delivery
- Dynamically identify problem areas
- Mitigate identified problems
Oracle Utilities Delivers Greater Value Faster

Oracle Utilities Outage Management System Express Implementation shaves time and money, getting you up and working with outage management in as little as six months. Oracle consultants arrive with a standard set of proven, pre-configured outage processes right out of the box, so you:

- Reduce the risk of cost and schedule overrun by eliminating scope creep
- Speed time to production to meet customer and regulator expectations
- Get a coherent, pre-tested solution designed by Oracle consulting staff with deep utility industry experience and systems expertise
- Accelerate time to productivity using Oracle’s pre-tested training collateral for processes and test cases

CONTACT US
For more information about Oracle Utilities Network Management System, visit oracle.com/goto/utilities or call +1.800.275.4775 to speak to an Oracle representative.

OUTSIDE NORTH AMERICA
Visit oracle.com/corporate/contact/global.html to find the phone number for your local Oracle office.
See How One Utility Used Advanced Distribution Management to Reduce Outage Durations

Customer Profile

Georgia Power is the largest subsidiary of Southern Company, one of the biggest generators of electricity in the United States. It operates as a vertically integrated utility, providing electricity to 2.4 million retail customers in all but four of Georgia’s 159 counties and to wholesale customers in the Southeast.

The utility co-owns and operates a network of more than 17,000 miles of transmission and 70,000 miles of distribution lines.

Challenges

Georgia Power’s service territory is subject to a variety of severe weather issues, ranging from hurricanes, violent thunderstorms, heavy winds and tornadoes to wildfires, ice and snow. A growing and increasingly demanding customer base necessitated improvements in grid reliability, cost reduction, operational efficiency and outage responsiveness.

Inefficient grid systems, paper process and inability to aggregate data hampered Georgia Power’s capability to reduce labor costs, isolate outages, effectively dispatch crews, and improve key performance indices, such as System Average Interruption Duration Index (SAIDI) and Momentary Average Interruption Frequency Index (MAIFI).

The Results

Using Oracle Utilities Network Management System, Georgia Power was able to quickly and significantly improve its distribution and outage management performance:

- Reducing SAIDI by knowing approximate fault locations and MAIFI and SAIDI by identifying unknown operations
- Decreasing labor costs associated with line patrolling
- Transitioning from paper maps and printed tickets to near real-time visualization
- Improving reliability numbers for five consecutive years

The Accolades

- Edison Electric Institute’s Recovery Award
- Emergency Assistance Award