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Revolutionizing Field Service: Oracle Utilities Mobile Workforce Management 2.0 Technology

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Executive Overview

Oracle Utilities Mobile Workforce Management 2.0 puts 21st Century technology at the service of field technicians, dispatchers, and supervisors. These technologies include some that may be familiar to utilities in other contexts, such as web-based interfaces. Other technologies, like computational grids, may be less familiar.

This white paper introduces these technologies and explains how Oracle Utilities Mobile Workforce Management 2.0 uses them. The paper also details the benefits these technologies offer to utilities and their mobile workforces.

The technologies discussed include:

- Computational grids.
- Real-time scheduling and routing.
- Exception management.
- Context awareness.
- Web-based interfaces and tools.
- Advances in communications, including platforms, interfaces, and pervasive communications.

Introduction: Oracle Utilities Mobile Workforce Management 2.0 Transforms Field Service

Highly rated software applications manage field services for most medium and large businesses today. But few utilities have been able to realize the full benefits of field service software.

The reason lies in the nature of their business. Utilities require field technicians with a wide range of skills and certifications. In the field, these technicians must address routine maintenance for hundreds of different types of assets. They must handle life-threatening emergencies. They must also perform various construction and repair tasks on customer-premise and utility-owned property as well as on rights of way in public spaces. And they must follow detailed procedures that protect not just their own health and safety but that of the public as well.

Contrast this range of tasks and associated responsibilities with typical assignments in other types of businesses, where field technicians may repair a limited number of equipment types or merely deliver packages.

Utilities have struggled with the failure of most mobile workforce software applications to address their full range of needs. They have been forced to maintain paper procedures long after other businesses have fully computerized field force business processes. They have struggled with the loss of knowledge they experience when workers retire. And they have watched their IT costs rise as different departments have implemented different mobile workforce applications for different purposes—one for scheduling service order appointments, for instance, and another for asset maintenance.

Oracle Utilities Mobile Workforce Management 2.0 overcomes the difficulties of the past by placing 21st Century computing technology at utilities' disposal.

Computational Grids Eliminate Boundaries

Many utilities service large geographic territories. Thousands of technicians and crews may perform hundreds of thousands of preventative maintenance activities and several thousand new construction tasks each year.

Older mobile workforce applications cannot handle all the associated data. Instead, they force utilities to restrict field assignments to sub-territories with tight, frequently arbitrary geographic boundaries. Consequently, utilities cannot schedule emergency responders across boundaries. They cannot schedule a crew to perform identical tasks on a linear asset that runs across an artificial territory boundary.

Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0) uses a computational grid that handles a utility's entire service territory as a single entity. It also incorporates all available data about every technician. With MWM 2.0, utilities can identify all technicians qualified to perform a task and move the optimal one to any location.

The computational grid incorporated into MWM 2.0 accepts any volume of data and divides it dynamically across multiple servers. It also divides complex problems like utility fieldwork planning and scheduling across those same servers. It then optimizes each field assignment by taking account of all the information across all the servers. And it schedules forward in time, months in advance.

The MWM 2.0 computational grid is exceptionally reliable. If a server goes down, the application continues to function using the remaining servers. Planning and scheduling continue uninterrupted, with emergency assignments and altered appointments accommodated in real time.

Real-Time Scheduling and Routing Accommodate Change

For utility field crews, there's never a day without change. Emergencies interrupt maintenance tasks. Customers change appointments. Assignments take more or less time than expected.

Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0) uses the computational grid's vast store of technician data across the utility's entire service territory to re-optimize resource use immediately, in real time, when a change occurs. It then reroutes crews using current road conditions and utility priorities like travel time and fuel consumption. There's no waiting for batch runs or dispatcher availability.

Exception Management Optimizes Dispatcher Time

The ability of Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0) to make real-time scheduling changes frees dispatchers from routine rescheduling tasks. Instead, dispatchers can focus their experience and judgment on such non-routine situations as:

- Emergency alerts:
 - Unacknowledged by the target crew.
 - Acknowledged but with no indication that the crew has arrived at the site in the expected time.

- Addressed but not completed within the expected time.
- Appointments:
 - Missed altogether.
 - Acknowledged by a crew that has not arrived in the expected timeframe.
 - Exceeding their expected duration or in danger of requiring unauthorized overtime.
- Alerts that:
 - A device has not been synchronized with the appropriate application in the timeframe expected.
 - A crew is idle or has no work remaining on its schedule.

Context Awareness Optimizes Decision Quality

Older field service applications used only a limited amount of basic information to schedule crews. The information available to dispatchers was even more limited.

Utility field realities, however, are complex. The interaction of many complex factors forms a context for every decision. Such contexts include multiple factors, including technicians’:

- Skills and certification levels.
- Recent work deployments.
- Recent overtime assignments.
- Current location.
- Priority of current task.

Contexts also include:

- The priority of the new task.
- The availability and location of parts needed to solve the problem.
- The probable time needed to complete the task.
- Utility service goals and priorities.

As a context-aware application, Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0):

- Reviews all available data from multiple sources (personnel files, current schedules, common priorities, maps).
- Assigns tasks according to utility-specific rules.
- Changes the context as conditions change. For instance, utilities may want to divert technicians from customer-scheduled appointments only if they have not already called ahead to tell the customer they are on their way. In this case, the application automatically changes the context of a new assignment as soon as the technician makes the call.

- Broadcasts the context of each decision so that dispatchers and supervisors can monitor, audit, or change any step, as required.
- Provides dispatchers with these same contexts when they must intervene or make emergency decisions.
- All these factors and many more

MWM 2.0 does not require a complete context, including every possible data point, before it delivers a result. Instead, like a human decision-maker, it acts on whatever information is available.

Knowledge Tools and Interfaces Speed Task Completion

Utility fieldwork is complex. And field technicians must comply with strict safety and quality standards. Those needs have long forced crew chiefs and managers to monitor fieldwork closely.

Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0) gives technicians knowledge tools that dramatically reduce the time needed to complete tasks correctly. These tools capture the experience of the most knowledgeable technicians and turn that experience into task guides and checklists readily accessible via standard web-based interfaces. They include:

- Process-specific wizards that accommodate many alternative field scenarios and that capture data based on context.
- Drop-down menus.
- Point-and-click as well as drag-and-drop options for data entry.
- Assistants that highlight errors or unlikely choices based on an analysis of previous data entered.

With MWM 2.0, yesterday's Gantt chart becomes a fully functional Web-based interface. Its drag-and-drop capability puts virtually all data just a mouse-click away.

Technicians using MWM 2.0 can answer many of their own questions, determine the better of various options for addressing a task, determine the best order for multiple steps in a task, and verify task completion. They no longer need to wait for the availability of an experienced crew chief or supervisor to approve work done and authorize a move to the next part of a task.

Detailed task checklists, backed by explanations that even inexperienced workers can follow, dramatically reduce training time, site time, and do-overs.

Tools for Supervisors

MWM 2.0 gives supervisors tools that compare technician decisions with a standard set of task-completion rules and alternatives. The application alerts supervisors to situations that appear not to meet specifications. MWM 2.0 also identifies technicians who appear to be taking longer than expected to complete specific types of tasks.

MWM 2.0 supervisory tools permit a great deal of supervision to take place remotely. Supervisors reduce travel time and can use that time to handle many more crews.

MWM 2.0 tools are particularly helpful when utilities use contract or loaned crews.

In the past, utilities found that outsourced field crews could encounter major problems that utilities learned about only well after the fact. Given that public safety issues could be involved in even relatively simple tasks like vegetation management, utilities frequently hesitated to outsource despite potential cost savings.

A different problem arose with technicians borrowed from other utilities to address widespread storm damage. Loaned crews frequently required extensive supervision that utilities were hard-pressed to find during emergencies. The result: delays in a return to normal.

MWM 2.0 solves both these problems. It equips contract and loaned crews with the same knowledge tools, monitoring, and interfaces available to “native” field technicians. MWM 2.0 also lets utilities integrate information about contract and loaned workers with “native” crew information.

Tools for the Multi-Language Workforce

Utilities welcome multi-lingual field technicians because they facilitate communication with multi-lingual customers. But problems can arise when dispatchers and technicians are most comfortable in different primary languages.

MWM 2.0 bridges the gap by permitting workers to change the language of their screens with a mouse-click. Technicians and dispatchers can discuss the same form while looking at versions in their preferred language.

A Communications Platform Keeps People and Devices Connected

Utilities have long used private radio networks and cellular services for communications between dispatcher and field technician. But problems abound. Spotty, incomplete cell phone coverage means utilities may be able to achieve reasonable reliability only through multiple contracts with multiple providers. The high cost of such coverage frequently encourages utilities to use a random assortment of less expensive “fill-in” communications systems when possible—Wi-Fi at utility-owned facilities, for instance, or radio for territories without public carriers.

Use of these disparate communications channels is especially complex when technicians use multiple communications devices. Training times grow. Errors occur as field technicians switch among different networks and among varieties and brands of equipment. And the multiplicity of networks turns device upgrades and network transitions into nightmares.

Security adds yet another dimension to the problem. Few external services provide the security utilities require, forcing many utilities to “own” their own mobile communication security policies. Even then, few, if any, provide adequate mechanisms for compromised (e.g. stolen or “hacked”) devices.

Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0) takes advantage of a major marketplace change: unified communications (sometimes referred to as “ubiquitous mobility”). Utilities can now equip field technicians with devices that can access multiple high-speed wireless networks. They can permit dispatchers, supervisors, and remotely located experts to use a single interface to

respond to field technicians without needing to know which devices those technicians are using. They can be confident that all technicians receive the same accurate data no matter what application they are running on any device. And they can receive and record data seamlessly from those multiple devices and applications.

MWM 2.0 also enables “persistent communication” (also known as “store and forward”). This lets technicians use their mobile devices even when they are not connected to a network. With persistent communication, mobile devices automatically reconnect as soon as network service becomes available, and all data entered and stored in the device since the previous connection is automatically transmitted.

To deliver unified communications, MWM 2.0 uses a mobile communication platform—a single point of administration from which to install, configure, and maintain all aspects of the communication/device network. All components share a common data model. Configuration, oriented around common business processes, integrates the mobile workforce application with all devices using it—not just laptops but also tablets, handheld computers, and cell phones that receive both screens of information and short message service (SMS) messages.

The MWM 2.0 platform also permits utilities to build in safety- and service-related monitoring functions. The application may, for instance, notify a dispatcher if a task is not completed within a certain timeframe, allowing the dispatcher to contact the technician and arrange for help. MWM 2.0 also lets utilities equip vehicles with automatic vehicle location (AVL) devices; with them, contact center representatives can inform inquiring customers about the current location of a technician scheduled for an appointment.

Conclusion: Realizing the Benefits

With the technology incorporated into Oracle Utilities Mobile Workforce Management 2.0 (MWM 2.0), utilities achieve:

- Better use of technician time. Field crews move to optimal tasks. Technicians consult remotely with experts regardless of location.
- Increased supervisor effectiveness. Supervisors can monitor tasks remotely and intervene immediately when problems arise.
- Higher dispatcher productivity. MWM 2.0 makes routine technician assignments automatically. That lets dispatchers focus on problems.
- Fewer errors. Technicians can use wizards and follow checklists to ensure work accuracy. They can use screens written in their primary language. They can consult with and get answers from supervisors no matter what device or what application they are using.
- Lower equipment costs. Technicians can use the lowest-cost communications devices that meet their needs, while utilities tie them together with efficient, organization-wide business processes.
- Faster, better training. MWM 2.0 reinforces classroom experiences and builds technician knowledge and confidence—even in the face of brand new tasks like Smart Grid deployments.

- Better replacements for retirees. With MWM 2.0's detailed tracking capabilities, supervisors can readily compare technicians' work and identify those with potential for advancement. They can then build this potential into the rules governing scheduling and dispatching to ensure that those with potential get the training they need to move up in the organization.

In short, Oracle Utilities Mobile Workforce Management 2.0 technologies increase field technician productivity, lower costs, and ensure that utilities meet their safety and reliability goals.



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