OpenWorld 2016
Roadmap for Oracle Utilities Operational Solutions
Pioneering a new era of innovation and sustainability

Bradley Williams, VP Strategy, Oracle Utilities

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Safe Harbor Statement

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Session Agenda

1. Key Operational Challenges Facing Utilities Today
2. Oracle Utilities Operational Solutions to manage key issues
3. Utilities Operational Solutions & Roadmaps
   - Asset
   - Workforce
   - Grid/Network Operations
4. Next Steps and Questions & Answers
Utility Challenges Operations to the Customer
Customer Service Excellence Relies on Field and Network Operations Management

Storm Response, Outage & Major Event Management
Customers continue to turn to conservation & distributed generation sources
Drought & extreme heat, stresses aging infrastructure

In the end, it's all about customer impact
Defining the **Leading Edge** of Innovation

**Optimization Engine**

*designed for utility-scale performance*

**Digital Transformation**

- Optimized workflow
- Exceptional service
- Prevents cost & error
- Mitigates operational risks

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*Granular Information Management Process*

- Customer
- Weather Events
- Regulatory
- Field Crews
- Meter & Sensor Data
- Grid/Network

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*Oracle*
Oracle Utilities Enabling Digital Transformation

Mobility Everywhere

Process Driven User Experience

Analytics Everywhere

Integrated Customer Experience
Customer-Centric Operational Solutions

- Asset Operations
- Network Operations
- Meter Operations
- Customer Operations
- Customer Experience
Oracle Utilities Technology Platform connects to the Edge of the Grid

INNOVATION

CORE TECHNOLOGY

OT
Operational Technology

IT
Informational Technology

CT
Consumer Technology

Modeling Entire Distribution Grid including Distributed Energy Resources

Intelligent, Mobile Employee

Leading Customer Experience Platform

Oracle Utilities Technology Platform connects to the Edge of the Grid
Oracle Utility Suite Overview
Core Utilities Applications/Platform to Enable Utility Transformation

Customer
- Customer Care & Billing
- Mobile Workforce Management
- Smart Grid Gateway
- Opower

Metering
- Meter Data Management
- Smart Grid Gateway
- Customer Self Service
- Load Analysis
- Load Profiling & Settlement

Work & Asset
- Work & Asset Management
- Operational Device Management
- Mobile Workforce Management
- Mobile Workforce Cloud Service

Grid/Network
- Network Management System
  - OMS/DMS/DERMS/DSCADA
- Operations Mobile, Water NMS
- Smart Grid Gateway
- Opower

Analytics
Oracle Utilities Work and Asset Management (WAM)

• Increase proactive work to reduce failures & improve productivity – Asset Performance Management (APM)

• Improve planning by quantifying investment need – Asset Investment Planning (AIP)

• Eliminate inefficiency that drives down work value & asset reliability

• Capture & employ best practices to boost business performance

• Balance capital to support demand growth & maintenance

• More effectively manage safety, health, & environmental risk

Asset Management

Device Management

Project Management

Work Management

Operational Accounting

Inventory Control

Purchasing
View Work Request on Map

Clicking the View in Map button displays the map again and zooms into the location of the work request.

The work Request is also highlighted on the page.
## WAM Asset Performance Management (APM)

Multiple factors are used to calculate a real-time Asset Condition Score

<table>
<thead>
<tr>
<th>Assessment Category</th>
<th>Types of Assessments</th>
<th>Total Asset Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictive – 50%</td>
<td>✓ Thermography – 50% ✓ Vibration – 50%</td>
<td>3.57</td>
</tr>
<tr>
<td>Observational – 20%</td>
<td>✓ Appearance – 40% ✓ Containment – 60%</td>
<td></td>
</tr>
<tr>
<td>Performance – 30%</td>
<td>✓ Pump Curve Test – 100%</td>
<td></td>
</tr>
</tbody>
</table>

WAM delivers a more reliable view of APM asset health
WAM Mobile Application

New Mobile Device Capabilities

- Delivers work to your device
- View Documents
- View Maps
- View Work Activity Plan
- Enter materials
- Enter time
- Add new documents
- Stores data until you are in range
- Designed for Tablets
Oracle Utilities Operational Device Management (ODM)
Lifecycle management for all smart field devices

• Smart field devices included are:
  – Meters
  – Field sensors, controls and communication equipment
  – Substation devices (RTUs, relays, communication, etc.)
  – Beyond meter Consumer Energy Technology devices (home area networks, smart thermostats, distributed generation, electric vehicles, etc.)

• Configuration and compliance management:
  – Manage and track firmware updates & security patches
  – Support governance and regulatory audits
  – Support Smart Grid Network Operations Center (NOC) processes
  – Service Order Management for Consumer Energy Technology asset registry process
Introducing WAM 2.2

Work Design & Estimating with Unitization, Capitalization, & Compatible Units

Construction Work Mgt.
Work Design
Unitization & Capitalization
Oracle Utilities Mobile Workforce Management

• Improve the speed & efficiency of short and long cycle work
• Reduce field costs while improving customer service
• Coordinate dispatch, call center & mobile resources in real time
• Complete high priority work the right way the first time
Mobile Workforce Management

*Drive Immediate Business Value...*

- Increase in the average number of field orders worked per crew per day
- Decrease in the average truck mileage per field order / average drive time per field order
- Increase in the appointment times met
- Decrease in the dispatcher head count / number of dispatch centers
- Decrease in vehicle maintenance & fuel expense costs
- Decrease in past due accounts receivables balance (collection crews)
- Decrease in overtime hours
- Increase in accuracy & currency of data

**Gas Utility**
- *wrench time increased, overtime reduced*
- *miles driven per day: down 12%*
- *vehicle cost: down 12%*

**Electric Utility**
- *Off cycle meter read performance: up 21%*
- *Off cycle meter volume: up 24%*

**Water Utility**
- *field orders worked / collector / month: up 92%*
- *Average 61-90 past due AR balance: down 47%*
Resource Planning & Scheduling

Functional Drilldown

• Create flexible appointment windows and realistic schedules
• Allocate work to appropriately skilled technicians
• Balance workloads using workforce-to-work order ratios
• Maximize workforce routing efficiency at the street level
• Manage same-day service requests, emergencies, and reschedules
• Use work-demand forecasting to simplify resource capacity planning
• Promotes compliance with Service Level Agreements and Regulatory Requirements
Common Dispatching Functionality

Functional Drilldown

- Reviews all available data arriving from multiple sources
- Assigns tasks according to utility-specific rules
- Changes the context as conditions change
- Notifies dispatcher of emergency alerts or exceptions (crews not arriving in time, crews not acknowledging, work not complete in time, crews with no work on schedule)
Mobile Communications Platform

Functional Drilldown

- Location Based Services (LBS) to capture GPS data
- Persistent communication (“store and forward”) – re-authentication and synchronization resumes when connected
- Supports communications across multiple high-speed networks
- Task appropriate, portable, and rugged devices
Oracle Mobile Workforce Cloud Service

Recent Innovation

- Flexible financial options
- Lower cost of entry
- Subscription based pricing
- Rapid ROI
- Scalability, reliability and security
- Focus on Innovation
- Move between on-premises & cloud

Recent Innovation
The “Edge of the Grid” is more complex

Most Distributed Energy Resources are outside utilities’ direct control. Intermittent distributed generation and variations in consumption patterns create information which is vital to efficient control of the network. This happens outside the reach of traditional utility SCADA systems & DMS.
Introducing Oracle Utilities Network Management System v. 2

Next generation customer-centric grid management platform

Secure, Scalable, & Open/Integrated
Grid management platform driving electric, gas, and water network operations...

• OMS
• DMS
• DERMS
• Microgrids
• Distributed Grid Mgt.
• Operational Analytics
NMS Advanced DG/DER modeling – to manage the edge of the grid

Distributed Energy Resource Management

Grid Optimization with DER
- DER Integration Operations Simulation
- Automated Restoration - FLISR
- Volt/Var optimization - Conservation
- Fault Location Analysis - Responsiveness
- Distributed Energy Resource Management System (DERMS)
  - DER operations planning & smart city pilots
  - Can be separate from existing OMS & DMS
  - Future outbound control and optimization

True load model is derived from aggregated net metered AMI Loads less the sum of the DG load shapes

Each type of customer DER has its own generation model/schedule derived from customer DER records & specific class models
Recent Innovation: NMS Operations Mobile Application

Operations Mobile Application on smart phones/tablets
– Major Event Management
– Field Switching
– Damage Assessment
– Bring your own device (BYOD) for contractors and temporary damage assessment staff.
Recent Innovation: NMS for Water and Gas Utility Operations

Water & Gas Network Management
- Customer Trouble Call & Event Management
- Valving Operations – real-time pipe network model
- Planned Maintenance Disruption and Notifications
- e.g. leakage detection and pressure monitors
- Manage major Breakage and Damage Assessment
- Future Flow Model Simulation and Optimization
OT Analytics Services... with DataRaker Analytics Extensions

Analytics Enhancement for Distribution Operations

OT Platform: NMS/WAM/MWM

• Connectivity Model
• Transformer location
• Transformer attributes
• Substation Outages
• Line loss and Length
• SCADA feed kVARh, kWh

DataRaker

Connectivity Model Correction
Meters are commonly incorrectly mapped to the transformer due to bad record keeping and efforts in storm restorations. This is an issue that can be found at every utility and can have significant impact on operations.

Conservation Voltage Reduction
By monitoring voltage at the end points, Utilities can safely reduce rates for purchasing bulk Power, reduce losses and prevent overloading of critical circuits.

Phase Balance
Transformers where the load is not well-balanced have a shorter life expectancy. DataRaker calculates the loads for three phase distribution transformers and feeders to help rebalance load and extend the performance.

Predictive Failure Analysis
Customers can experience flickering and appliances can get damaged when current is not consistent. This could be an issue that a transformer is going to fail and should be replaced.

Outage Management
Utilities would like to know where and how often momentary outages occur over a set periods of time to give insight into preventative maintenance.

Connectivity Model Correction

Phase Balance

Predictive Failure Analysis

Outage Management

APM - Assets at Risk
Transformers can be overloaded for significant durations due to higher than expected load e.g. EV charged when customers come home. Identifying significantly overloaded transformers can right-size assets to match given load.

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Operational Platform for Customer-centric OT Solutions

*Customer and Device Interaction is driving utility operational transformation*

Smart homes: 339 million devices (83% growth)

Smart buildings: 518 million devices (42% growth)

Utilities: 314 million devices (21% growth)

2016 worldwide estimates and yearly growth rates
Source: Gartner, Dec 2015

Smart Grid Gateway

- building energy management
- smart meters
- smart sensors
- DER & DR monitors
- smart consumer technologies

- ODM/WAM
- Opower
- CCB
- MDM
- NMS
- MWM

- smart consumer technologies

2016 worldwide estimates and yearly growth rates
Source: Gartner, Dec 2015
**WAM/ODM Roadmap**

**WAM/ODM V2.1.1**
- Situational based maintenance
- Enhanced PM processing
- WAM/ODM interoperability
- Invoicing
- OUA support
- GIS / ESRI features
- ERP connector

**WAM OUA**
- Four measurement areas

**Field Work PIP 12.2**
- CCB to WAM
- Sync of service points
- Initiate field activities

**ERP Connector Phase 2**
- ERP master supply chain

**WAM/ODM V2.1.1**

**WAM/ODM V2.2**
- Construction Work Mgt.
- Work Design
- Unitization & Capitalization

**WAM Mobile**
- Delivers work to your device
- View documents
- View maps
- View work activity plans

**ESRI – Phase 2**
- Initiating work
- Visualizing assets

**Field Work PIP V12.2.1**
- Complex work
- Construction
MWM Roadmap

**MWM V2.3**
- OUAF 4.3, ILM, CMA
- New Gantt Chart (performance, usability)
- New Mobile Communication Platform (MCP)
  - New HTML5 JavaScript architecture
  - Disconnected Support for Windows 8.1, iOS & Android

**OMWCS 2.3**

**1 – 12 months**
- **MWM V2.3 SP1**
  - OUAF 4.3.0.3
  - Mobile App Toolkit I
  - Crew mass update
  - Enhanced CMA

**OMWCS 2.3 SP1**

**12-24 months**
- **MWM V2.3 SP2**
  - Mobile App Toolkit II
  - Cloud Enhancements

**OMWCS 2.3 SP2**

**MWM V2.4**
- Historic speed profiles and more map content
- Mobile productivity
- Integrations
- Utility-specific processes

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NMS Roadmap

NMS V1.12 SP2
- DataRaker
- Advanced DER/DG Models
- DER/DG Forecast Input
- NMS-MWM Fieldwork Integration for Crew Assignment and field updates

NMS V1.12 PaaS
- NMS PaaS
- OCS NMS PaaS Managed Service
- Key FY17 Sales Play for + Water Network Management + DERMS POC’s

NMS V2.3
- Customer Voted Features
- New Alta User Interface
- Mobile, Water, & AMP improvements
- AMI Voltage integration
- Protection/Control interaction
- OUA Enhancements

NMS V2.3 Service Pack 1
- Temporal Network Models (historical, real-time operations, & planning)
- Decrease patching down time
- Weather Storm Damage Forecast
- Opower outage notifications
- Outbound DER Control / Interaction
- Contingency Analysis

NMS Analytics (OUA) V2.7
- Outage Schema updates
- New Facts
- Outage Dashboard updates
- OBIEE 12c

1 – 12 months

12-24 months
Oracle Utilities OT Solutions

Defining the **Leading Edge** of Innovation

- **Accelerated Delivery**
- **Lowered Cost**
- **Increased Value**

**Greater Value Faster**

- Customer-centric
- Optimized Business Processes
- Edge of the Grid
- Agility, Flexibility
- Innovation
Q & A