Newton-Evans Research Company's

Market Trends Digest

December 2011

NEWTON-EVANS RESEARCH COMPANY www.newton-evans.com

Excerpts from "Global Study of Data Communications Usage Patterns and Plans in the Electric Power Industry: 2011-2015"

The findings presented and excerpted from this study are based on a global research survey sent out by Newton-Evans over the course of the second and third quarters of 2011. One hundred and two utility officials involved in Operations Planning and Design responded to the survey. These utilities combined serve over 153 million end use customers globally; 30 million in the U.S. alone.

What are some of the key datacomm issues facing your utility?

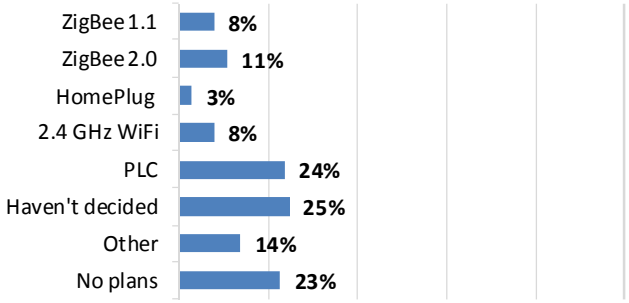
In summary, when reviewing the comments received from most of the participating utilities, there is almost a different issue or sets of issues facing each utility when it comes to key data communications challenges. Newton-Evans' analysts have grouped the large number of responses into several categories. The most frequently mentioned issue across all 81 comments was Cost (mentioned in 22 comments) followed by Reliability (mentioned in 16 comments) and Security (15 comments.) Other issues mentioned included zoning approval for new radio towers, communications carriers facing the same economic pressures as utilities, choosing a DA communications technology, the impact of data management on computing and human resources, lack of ability to manage disparate systems with utility resources, and others.

For your customer-site residential/commercial application needs, what technology do/will you employ?

Twenty-five percent of utilities said they haven't decided on a technology for customer-site residential/commercial applications. Twenty-four percent either currently use or plan to use Power Line Carrier (PLC); this was the most frequently cited among the listed options provided on the survey. Twenty-three percent have no plans for Automated Metering Infrastructure (AMI) which screened them out of this portion of the survey.

Cooperatives were more likely to be using or planning on using PLC than others. Public utilities were more likely to be undecided. International uncertainty was prominent among respondents from the Asia-Pacific region.

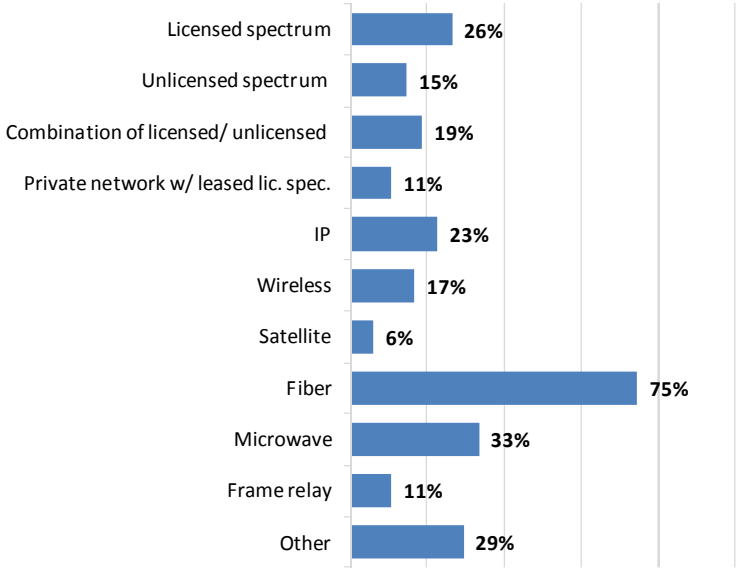
For your customer-site residential/commercial application needs, what technology do/will you employ?



Which communications technologies do you use to meet the needs of your SCADA system?

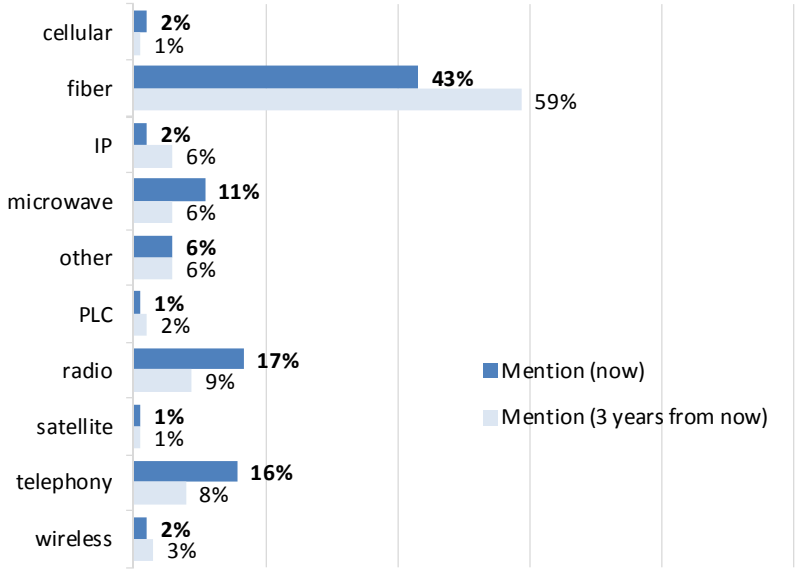
Fiber was the clear leader among the many communications options available for acquisition of SCADA data from transmission and distribution substations. Microwave was next in importance, followed by licensed spectrum radio and a mix of licensed and unlicensed spectrum.

As seen below, several radio frequency spectrum options were of importance. IP and wireless approaches have gained in popularity over the past several years. IOUs indicated strong use of fiber and microwave, while public power utilities also reported high levels of fiber use. Cooperatives were using fiber and multiple forms of radio communications. Canadian utilities reported fiber and wireless communications. International utilities were more likely to be using IP, fiber and "other" forms of communications.

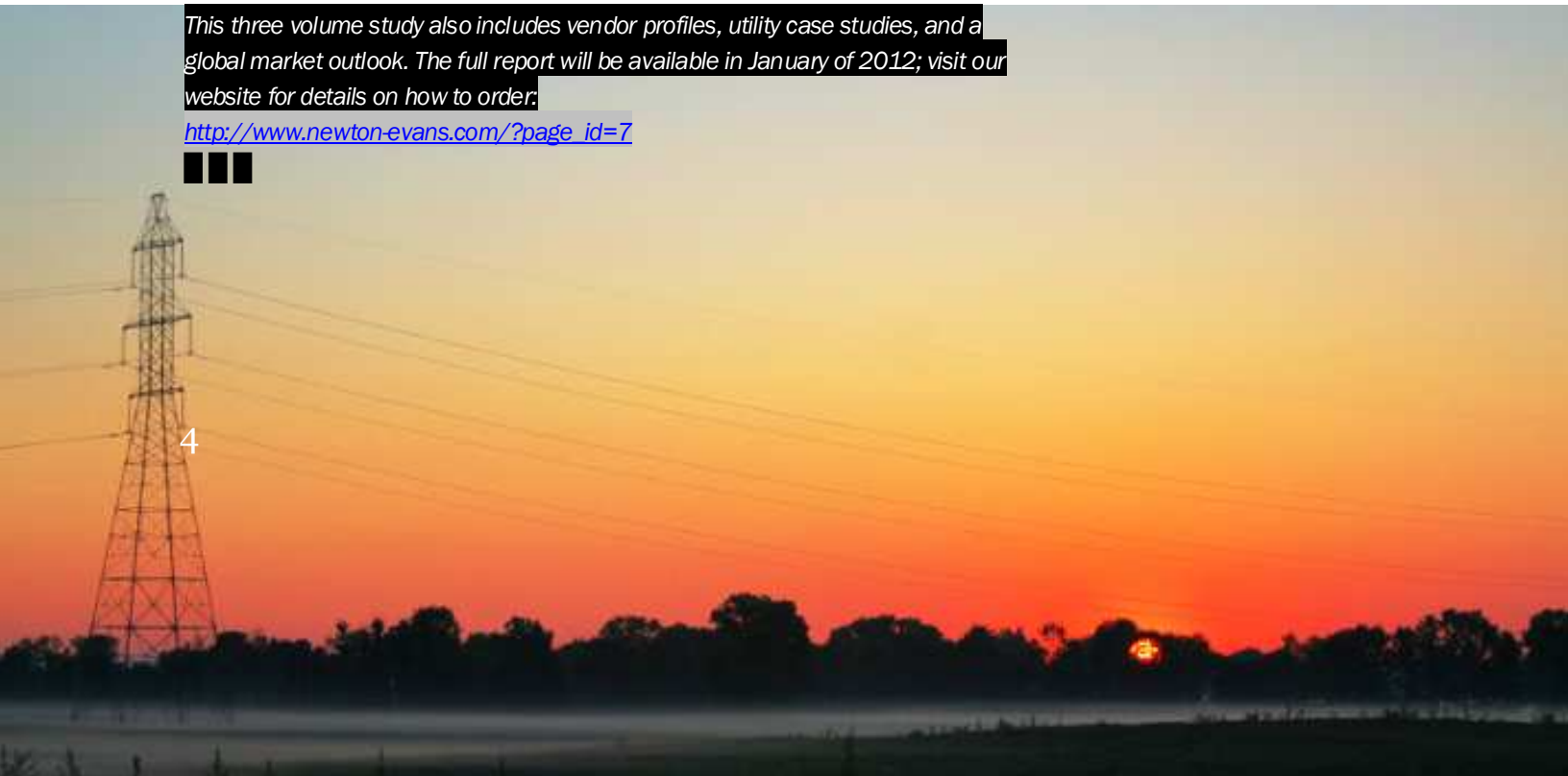


Which SCADA communications technology has the dominant use NOW at your utility and which do you expect to be dominant 3 years from now?
Fiber was most frequently cited as the dominant SCADA communications technology in 4th quarter 2011 and three years out. Radio and telephony came in a distant second and third in terms of the number of mentions.

Survey respondents provided a great deal of information as to the current use and planned use of key technologies. The response groupings are based on the selections made by utility officials.



This three volume study also includes vendor profiles, utility case studies, and a global market outlook. The full report will be available in January of 2012; visit our website for details on how to order:
http://www.newton-evans.com/?page_id=7

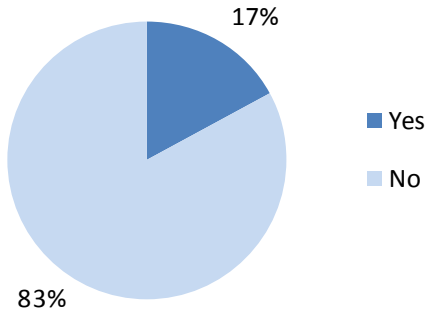


Study Shows U.S. Public Utility Commissions Are Not Pressuring Utilities to Implement Dynamic Pricing

The following topics pertain to the Public Utility Commission survey conducted as part of the 2011 study, "The Worldwide Smart Grid Market in 2011:A Reality Check and Five Year Outlook Through 2015." Newton-Evans surveyed 40 PUCs in the U.S. for their policies and points of view.

Do/Will you require utilities to include a Dynamic Pricing model as part of their plan to install smart meters?

The majority of respondents reported that they do not require utilities to offer dynamic pricing as part of a smart meter program.



If yes, which model will be used:

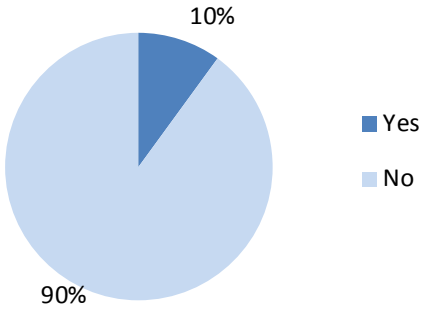
Out of the seven PUCs that require dynamic pricing to be offered with smart meters, there was a pretty even split between the 4 options provided on the survey. Four out of seven opted for Time of Use. Respondents were allowed to choose more than one option.

	Peak Time Rebate	Critical Peak Pricing	Time of Use	Other	Total
Total	3	3	4	4	7
Percent	43%	43%	57%	57%	100%

Do you have any conditions that must be met by utilities in order for them to receive approval to spend self funded Smart Grid money?

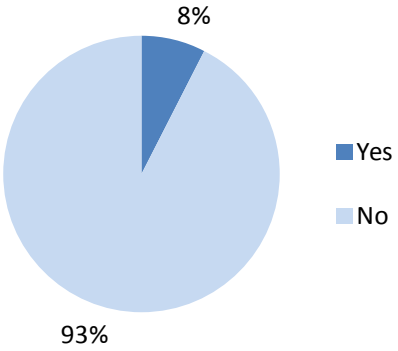
Out of the 40 PUCs that answered this question, the majority do not have any conditions for approval to spend self-funded smart grid money. For this study, self-funded means a utility would use their own company resources (from existing rates already approved by their PUC and/or additional

resources requiring the PUC to approve a rate increase) to support smart grid activity.



Do/Will you require utilities to include renewable energy sources (solar, wind, bio-fuels, etc.) as part of their smart grid plans?

Almost all PUCs reported that they do not require utilities to include renewable energy sources as part of smart grid plans.



Will you require utilities to offer consumers a separate rate schedule for their Plug In Electric Vehicle (PEV) Program?

Only one out of the 40 PUCs surveyed will require their utilities to offer separate PEV rate schedules, and it's not part of a pilot program.

This report series is currently available for purchase on our website:
http://www.newton-evans.com/?page_id=7

A “Janus View’ of the Electric Power Industry in 2012: Chuck’s Composite Viewpoints on What’s New and What’s Coming Around Again

Article by Charles Newton, CEO

1.

There is no **self-healing grid** coming any time soon for most (if not all) electric power utilities anywhere in the world. Over the past few years, Mother Nature has shown us who rules the roost regarding the reliability of the grid in times of natural disasters, in spite of hundreds of millions of dollars invested in shoring up grid defenses and building networked distribution grid systems. Quite simply, overhead construction cannot cope with the variety and strength of ever-more powerful weather systems and other acts of nature. Even underground systems have been less than 100% satisfactory in these uncertain natural conditions. If an underground cable is inadvertently cut by a contractor, there may be enough work-arounds to reroute power quickly in a networked system, typically limited to densely populated urban areas. However, if nature knocks down one overhead line, chances are that multiple lines will fall as well (witness the New England October snow storm). One wish for this new year is that we will discontinue use of the term “self-healing grid.”

More than 80% of the nations’ medium and low voltage grid is of overhead construction and most of this has been in place for many years. The trend over the past 30 years has been to place new distribution lines underground, and by January 2012, well over 1.2 million miles of underground lines are now in service. However, that leaves us with more than 4 million vulnerable overhead line miles.

Transmission lines are almost all above ground. Exceptions are found in some major metropolitan areas, but the expense associated with high voltage underground/submersible HV lines relative to the costs of overhead transmission lines, has kept underground technology from gaining significant traction. Today, more than 97% of transmission lines (220kv and above) are above ground installations. While more than 80% of all significant power failures are distribution-related, this still leaves us with susceptibility to natural (and unnatural) calamities striking our transmission infrastructure.

2.

Cloud Computing – Remote Computing Redux: No, cloud computing is not really that novel for the electric power industry. Cloud computing may be the next new thing for a younger generation of IT people, but the concept has been around for nearly half a century, since GE formed an alliance with Dartmouth College in 1964 to establish a remote computing capability. Now that it has returned as "the cloud" and as some observers are touting the benefits for all utility applications, let's think twice (long and hard) before moving critical operational systems/services "to the cloud." (See my exception to this rule next: SCADA as a service).

Cloud computing has been all the rage in the computing/IT industry in recent years. As a participant then working as the principal applications planner for the world leader (General Electric Information Services) in Gen One of Cloud Computing, I have a keen interest in seeing how widely accepted this new generation of remote computing services will become for the electric power industry, given its appeal to some industry officials and observers. However, we need to ascertain that robust, assured and secure communications are in place to and from the cloud before we move any key infrastructure systems in that direction.

Just note that by 1975, scores of large utilities across the world were using remote computing services to conduct load flow studies, perform short circuit analysis, network stability, transient analysis and similar applications. GE, Control Data, IBM, Boeing Computer Services, McDonnell Douglas Automation, Tymshare, and 30 other providers had already forged a multi-billion dollar industry in first generation cloud computing services. These networks used a variety of secure, proprietary communications protocols and then-strong encryption techniques were used when financial consolidations were performed for Fortune firms using these services providers.

3.

SCADA as a service has been discussed before, and Newton-Evans has conducted repeated studies on its potential appeal to smaller utilities over the past quarter century. There has never been a great deal of utility market interest in such an approach to supervisory control and data acquisition, and yet, it seems to this observer that such an approach may now be an appropriate choice for small utilities. Keep in mind that the U.S. alone has more than 2,200 small electric power utilities, each serving fewer than 10,000 customers. While some of these have their substations controlled and monitored by power suppliers or transmission companies, others have

minimal monitoring and little control over their field assets. A reasonably priced, secure SCADA service, organized in a somewhat similar fashion to some of the country's large home monitoring services, (or even a demand response operations center) might work well, with regional or nationwide services providers that would install substation instrumentation and enable remote control from anywhere with 24/7 operations in the remote control center. The concept could easily be extended to include distribution network management services, with providers installing distribution automation devices.

4.

A **national mandate** may be needed soon to keep from falling behind the rest of the world. We begin 2012 in desperate need of a national mandate and strong federal investment to move the electric power industry ahead and to shore up our entire range of critical infrastructure sectors. The U.S. operates a first world grid to be sure, one of great complexity and with thousands of entities involved. Desperation may be too harsh a term to use here, yet it seems as if no one in a position to serve as an agent of change is listening to the increasingly louder cracks appearing in each sector of the nation's critical infrastructure assets. Many of our pipeline transport networks are 50 or 75 years old, with our large eastern and mid-western cities dependent upon susceptible water pipes that may be approaching their centennial birthday in service. Our bridges may shake or rumble as we drive across, and tunnels can give us pause as we traverse them watching the wall tiles fall down as we go. Yet, there seems to be little appetite for funding such nation-building as we so desperately need. Not a single presidential candidate has voiced strong support for such programs. Federal and state revenue buckets would be raised significantly by virtue of the hundreds of thousands of multi-year construction and maintenance jobs that would definitely be created if only such a mandate was developed. Few of us would not benefit from being taxed with the proviso that all such revenues are to be dedicated to shoring up the nation's infrastructure.

5.

Data Analytics – New, or maybe not so new? Data analysis is nothing new to the IT staff on the Operations side of the utility house. Analysis of incoming streams of data in near-real time has been ongoing since the first SCADA installations went in service more than 40 years back. The real-time operational data streams have been growing steadily each year, and with each new generation of intelligent field devices installed. The ability of state estimators, generation control software, bad data identification algorithms,

distribution network management software and the like have been in use and refined over the past few decades. Operational data analytics has been a mainstay in coping with the increased amount, variety and complexity of incoming data from the thousands of smart field devices now installed.

To paraphrase from Wikipedia's notes on the topic, data analytics is the science of examining raw data with the purpose of drawing conclusions about that information. Data analytics have been used widely to enable companies and organizations to make better business decisions. Data analytics differs from data mining, which is the process of sorting through huge data sets using sophisticated software to identify undiscovered patterns and establish hidden relationships. Data analytics focuses on inference, the process of deriving a conclusion based solely on what is already known by the researcher. Thus, its newer and increasingly important role in the utility will be to assist utility enterprise IT organizations to analyze in near-real-time, the vast mountains of metering and customer data for usage patterns and trends. There will be a need to link such enterprise analytics with the operational analytics before long adding to the complexity, but perhaps resulting in a more optimized and smoother running utility.

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Newton-Evans Research Topics and Activities in 2012

Newton-Evans Research Company will have a very busy first quarter in the new year. The company will be conducting concurrent research surveys in January and February; one of these will provide report findings for the ever popular "Worldwide Study of the Protective Relay Marketplace in Electric Utilities" forecasting the years 2012-2014. Other topics of interest include capacitors, generation control, the market for large power transformers, as well as many 3-5 page summaries on various medium voltage topics:

High Voltage Series
Complete HV Series Price: $975.00
HV01 - FACTS and RPC
HV02 - HVDC
HV03 - Air Insulated Substations
HV04 - Gas Insulated Substations
HV05 - Air Insulated Switchgear
HV06 - Gas Insulated Switchgear
HV07 - High Voltage Bushings
HV08 - High Voltage Capacitors
HV09 - High Voltage Circuit Breakers
HV10 - HV Disconnect Switches
HV11 - High Voltage Circuit Switchers
HV12 - HV Instrument Transformers
HV13 - Air Core Reactors
HV14 - HV Surge Arrestors
HV15 - Generator Disconnect Switches
HV16 - Generator Circuit Breakers

Power and Distribution Transformer Series
Complete Transformer Series Price: $975.00
TX01 - Mobile Transformers
TX02 - Medium Power Transformers
TX03 - Med-Large Power Transformers
TX04 - Large Power Transformers
TX05 - Very Large Power Transformers
TX06 - Shunt Reactors
TX07 - Special Transformers (Arc, Furnace)
TX08 - Distribution Transformers (OH, Oil, 5kva+)
TX09 - Distribution Transformers (Dry Type)
TX10 - Distribution Transformers (Pad Mount)
TX11 - Transformer Life Management Services
TX12 - Transformer Monitoring and Diagnostics

Distribution Automation Series.
Complete Series Price: $975.00
DA01 - Automatic Circuit Recloser Controls
DA02 - Sectionalizers
DA03 - Voltage Regulators
DA04 - Capacitor Bank Controllers
DA05 - Fault Indicators
DA06 - Pole Top RTUs
DA07 - Line Mounted Monitoring Devices
DA08 - Communications Components – Power Line
DA09 - Communications Components – Wireless Cellular
DA10 - Communications Components – Radio
DA11 - Software for DA
DA12 - Engineering Services for DA

Control Systems and Services Series
Complete Control Systems and Services Series Price: $975.00
CS01 - EMS Systems Integration
CS02 - Distribution SCADA
CS03 - Geographic Information Systems
CS04 - Customer Information Systems
CS05 - Outage Management Systems
CS06 - Meter Data Management Systems
CS07 - Mobile Workforce Management Systems
CS08 - Advanced Distribution Automation
CS09 - Electric Power Market Management System
CS10 - Power Exchange Systems Integration
CS11 - Cyber Security Software for Control Systems

Substation Automation Series:
Complete Series Price: $975.00
SA01 - Remote Terminal Units
SA02 - Programmable Logic controllers
SA03 - Substation Automation Platforms
SA04 - Multifunction Meters and Recorders
SA05 - Inter-Utility Revenue Meters
SA06 - Digital Relays
SA07 - Digital Fault Recorders
SA08 - Sequence of Events Recorders
SA09 - Power Quality Recorders
SA10 - Substation Reclosers and Voltage regulators
SA11 - Substation Automation Integration Specialists
SA12 - Substation Communications
SA13 - Substation Construction Outlook

Protection and Control Series:
Complete Series Price: $875.00
PR01 - Feeder Relays
PR02 - Line Differential Relays
PR03 - Generator Relays
PR04 - Motor Control Relays
PR05 - Electro-Mechanical Rela5ys
PR06 - Drop-In Control Houses
PR07 - Synchrophasors (PDUs/PDCs)
PR08 - Teleprotection

Medium Voltage Series
Complete MV Series Price: $1,500.00
MV01 - Air Insulated Metal Clad Switchgear
MV02 - MV Motor Controllers
MV03 - MV Gas Insulated Switchgear
MV04 - Automatic Circuit Reclosers
MV05 - Outdoor Distribution Circuit Breakers (5-38kv)
MV06 - OEM Switches
MV07 - Load Interrupter Switchgear
MV08 - Overhead Switches (15-38kv)
MV09 - Sectionalizers
MV10 - Fused Cutouts
MV11 - Pad Mounted Switchgear
MV12 - Bus Duct
MV13 - Substation Pad Mount Capacitors
MV14 - Current Controllers/Fault Current Limiters
MV15 - Current Limiting Fuses and Links
MV16 - Instrument transformers
MV17 - Substation Based Power Equipment Centers
MV18 - Submersible/Underground MV Switchgear
MV19 - MV Surge Arresters
MV20 - MV Voltage Regulators

For more information and to see brochures for our studies, visit:
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