

Fault localization in the cloud

Distribution Automation

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Fault reporting – fast, flexible and direct

Fault detection and signaling systems, the basis for state-of-the-art, fast, and efficient management of faults in power grids, have always been connected to control centers.

Fault localization in the cloud now offers a new, cloud-based service for reporting faults directly to maintenance crews, including the exact fault location – and with no need for a control center. It makes fault reporting possible without any control centers or complex IT hardware, enables mobile signaling, and is astonishingly economical. It's time for you to discover fault localization in the cloud!



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Efficient fault management is a must

Demand for supplying industrial customers and households with secure and reliable electric power is more crucial today than ever before. To date, however, only a small portion of existing medium-voltage grids are automated and intelligent. This results in substantial maintenance costs and effort, particularly among distribution grid operators.

One of the most important technical tasks of distribution grid operators is fault management: restoring power supply as soon as possible in the event of a short circuit or ground fault. If an overhead line is damaged, for example by a falling tree, or if older cable lines incur insulation damage, locating the fault is usually a very time-consuming and complex task: Maintenance crews have to check the fault passage indicators (FPI) along the overhead line runs, or drive from one cable network distribution substation to the next to localize and eliminate the faults. Fault reporting systems shorten this process significantly. However, until now such systems have always been connected to a control center.

Fault localization in the cloud is the state-ofthe-art service from Siemens for detecting and localizing fault locations efficiently, simply, and economically without grid operators having to



build and maintain a high-investment IT and OT infrastructure.

What makes fault localization in the cloud so unique is its specific use of cloud computing in conjunction with modern fault indicators from Siemens. This new approach enables grid operators who have no control center of their own to benefit from the advantages of modern digitalized solutions for fault management.

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Fault reporting today

In the event of a fault, a fault display at the control center signals that a circuit breaker or disconnect switch has been actuated and opened in the distribution line section affected. Control station personnel can thus quickly determine in what section the fault has occurred and dispatch a maintenance crew directly to the identified fault location. There's no need for time-consuming searching to find the faulty power grid section, which, especially in rural areas, can easily take several hours. For some time now, manufacturers have been able to equip fault indicators with a modem or a mobile communication gateway, enabling them to use such channels for reporting faults. Until now, however, a control center was always needed at the other end of the communication chain. There, incoming signaling from fault indicators was collected and centrally assessed.

With fault localization in the cloud from Siemens, FPIs equipped with a mobile communication gateway no longer communicate with a control center, but rather with the Siemens Cloud. Grid operators have no need for any further technical infrastructure.





Reporting faults directly to mobile devices

For the first time ever, fault localization in the cloud makes the advantages of modern fault reporting available to distribution grid operators who have neither their own grid control center nor the necessary communications infrastructure. Faults are reliably reported via the Siemens Cloud. With no additional technical effort or investment in expensive hardware, any grid operator is given the means of offering its customers fault management of the same quality available to major grid control center operators.

The starter package preconfigured for cloud service comprises a communication gateway and three fault indicators. A connection to the cloud service is established automatically during installation and commissioning. Every customer can manage service crews, store address data and telephone numbers of employees, and record information on the fault indications to gain a spatial overview of the fault indicators within its medium-voltage network and the reports they transmit. Siemens' fault localization in the cloud is compatible with all modern smartphones and tablets, and can be expanded to meet any need by adding more fault indicators as well as further Siemens Cloud services. What's more, cloud technology stands for maximum reliability and absolute state-of-the-art IT security.

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Available anywhere and easy to operate

Fault localization in the cloud provides a comprehensive range of grid monitoring functions as a user-friendly, Web browser-based plugand-play solution, and is thus available at any time from mobile devices. It is the ideal solution for distribution grid operators.

Fault localization in the cloud is very simple to operate. When fault indicators are installed, they are automatically registered by way of a Quick Response (QR) code scan and the indicator's Global Positioning System (GPS) coordinates. From then on, faults are immediately signaled, and the signaling fault indicators are displayed on a geographical map.

Fault reports are transmitted directly to the mobile devices of the maintenance technicians.

In this way, distribution grid operators can greatly reduce the amount of time and work needed to locate faults without having to invest in deploying and maintaining a complex infrastructure of IT systems and operational technology.



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Extraordinarily simple to put into operation

A single fault localization in the cloud set contains one communication gateway and three FPIs. Users simply log into the frontend of fault localization in the cloud from their own workplace, and enter and save the mobile phone numbers of their staff members.

The communication gateway is already equipped and pre-parameterized for its use with fault localization in the cloud. No further setup tasks or additional, dedicated mobile phone contracts are needed. The fault indicators, too, are pre-parameterized and recognize each other automatically. They log into fault localization in the cloud automatically via the SIM card, and need only be field-mounted onsite to the power lines and poles, and a mere few work steps performed online to complete their registration.





Registration by plug and play

Registering the fault indicators is quick and easy thanks to the pre-parameterization of the indicators and gateway:

- The fault indicators recognize each other automatically via secure short-range communication (NFC).
- Field technicians simply scan the QR code printed on the fault indicator, enter a few criteria such as the pole number and line name via their mobile phone, and allow positioning of their mobile phone.
- The fault indicator logs into the Siemens Cloud, which then recognizes the indicator's location and marks it in Google Maps with a pointer symbol.
- This simple procedure is then repeated for the other two FPIs. A complete set can thus be mounted and put into operation in no time at all.





Fast and reliable fault localization

With fault localization in the cloud, faults can be indicated either on a PC or directly on the user's mobile phone:

- When a fault indicator identifies a short circuit or ground fault, it transmits a fault signal to the gateway via a secure short-range communication link.
- The gateway forwards this information by mobile communication to the Siemens Cloud.
- The Siemens Cloud recognizes the initiating devices, marks them in Google Maps while simultaneously transmitting an e-mail to the phone numbers of the specified recipients with a map link.
- When the e-mail is opened, the initiating fault indicators are displayed in Google Maps. The field technician who takes charge of attending the fault acknowledges its receipt and his acceptance of the task. All other participants are thereby informed of that acknowledgment accordingly.



- Field technicians can process fault reports directly on their smartphone, save comments, and take photos of any damage incurred. The stored information can later be retrieved for documentation purposes.
- Once the fault has been eliminated, the fault indicator is reset, and the field technician approves the power-grid section for release by smartphone directly at site.

Registering FPIs	Localizing via fault localization in the cloud		Replacing FPIs			
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Replacing fault indicators is simple

If a fault indicator needs to be replaced with a new device, the exchange takes just a few mere steps:

- The defective device is removed from the power line it was monitoring.
- The QR code of the device being removed as well as that of the new device are scanned, and the new serial number is displayed in the app. The field technician then confirms the new number with the General Packet Radio Service (GPRS) data.
- The new device is then also recognized in the Siemens Cloud, replacing the former device.





Fault localization in the cloud means:





... less maintenance work

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... being able to access data easily

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