



SIEMENS

Ingenuity for life

Spectrum Power™ ADMS

The platform to meet your future
distribution operation needs

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The answer to today's electricity distribution challenges

More resources, more data, more intelligence

While the grid system has become increasingly complex due to the integration of distributed energy resources and storage, these challenges have created opportunities to rethink the world of power distribution management. When integrated into the distribution grid, smart meters, demand response, and distributed storage and generation – in combination with increased grid automation – are inundating utility systems with data that needs to be intelligently managed and leveraged for effective operation.

Reliability is key

At the same time, utilities are facing growing regulatory and customer pressure to maximize grid efficiency and provide reliable service at all times. This encompasses not only efficiently managing day-to-day construction, maintenance, and repair efforts, but also proactively and safely guiding operators when they are needed most – for example, during storms and outage restoration activities – all with the goal of customer satisfaction through timely communication and quick service restoration.

The future of distribution management

To enable utilities to face these current and future challenges successfully, Siemens has entered the next era of power control systems: the Spectrum Power™ Advanced Distribution Management System (ADMS). It integrates distribution SCADA, outage management, and advanced fault and network analysis – all operated in a Common User Environment – to gain maximum benefit from smart meter information and provide a solid foundation for the management of tomorrow's grid today.

The 3-in-1 modular solution

Spectrum Power™ ADMS is an essential element in maintaining and improving delivery reliability while reducing complexity and automating related work processes. To achieve this, it integrates three core components – Monitor & Operate, Analyze & Optimize, and Track & Restore – in one system to bring your distribution management to the next level. It is the answer to the operational challenges of large distribution networks.

Being a modular solution with component-based architecture, we can deliver one component at a time depending on business priority or integrate into existing systems.

3-in-1 solution

Spectrum Power™ ADMS



The unsurpassed expertise of Siemens



A market leader
in energy automation



160 years of experience
in power engineering



Support in over 90 countries



Over 1,600 network control systems
currently installed worldwide



Vertical integration through
standardization (IEC, CIM)



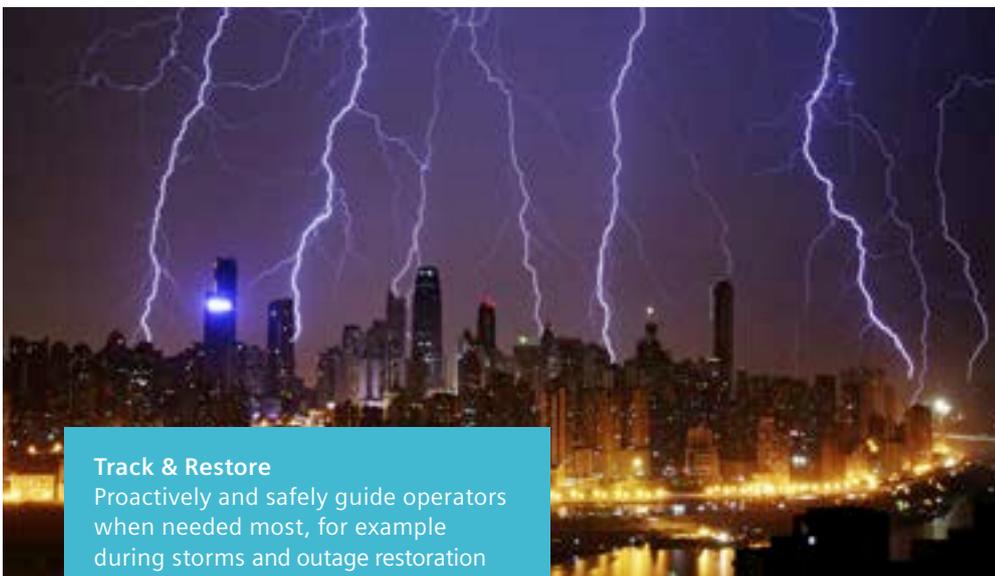
Powerful products, applications, and
solutions with clear-cut migration
and innovation strategies



Monitor & Operate
Enable safe monitoring and control of the electrical distribution network for operations personnel



Analyze & Optimize
Reduce network load at peak times and increase network efficiency and reliability



Track & Restore
Proactively and safely guide operators when needed most, for example during storms and outage restoration activities



Spectrum Power™ ADMS

Spectrum Power™ ADMS key benefits

- Monitors, controls, and optimizes distribution network operation to increase operators' situational awareness, reducing reaction time
- Integrates increasing renewable generation while providing high operational efficiency
- Optimizes asset utilization, with minimal network load and losses
- Efficiently manages day-to-day maintenance and repair efforts to support network reliability
- Shortens outage restoration times, improving customer satisfaction and critical reliability KPIs

Spectrum Power™ ADMS key features

- Distribution SCADA enables full support for single- and three-phase distribution networks, extended tracing for outages, and more
- Distribution Network Applications (DNA) to estimate fault location, automate service restoration, and execute power flow calculations for switch execution and network optimization
- Outage management, including: storm management, outage prediction, mobile crew collaboration, and outage archiving with reporting and KPI tracking
- Geospatial network diagrams, including street information and satellite views
- Flexible solution to deliver all three components or just one; modular architecture to integrate with existing infrastructure
- Seamless workflow support with efficient interaction and comprehensive outage views of geospatial and schematic network diagrams

The Spectrum Power™ ADMS difference

With Spectrum Power™ ADMS by Siemens, all you need is one system to bring your distribution management to the next level of efficiency. It integrates one single operational technology platform and one Common User Environment for SCADA, distribution management, and outage management (OM). It offers full network transparency – from high voltage to low voltage – for improved reliability, efficiency, and optimization.

- **Reliability** – By avoiding unplanned outages and reacting quickly and efficiently to disturbances or potential problems, utilities can improve their reliability to satisfy regulatory mandates and thus avoid regulatory penalties.
- **Efficiency on two levels** – Efficiency for the crew and personnel as well as the reduction of losses means fewer unnecessary delivery costs and a lower number of truck rolls.
- **Optimization** – When the system is configured for optimal operation, utilities can minimize the search time and mileage for fault location and automatically isolate and restore service.

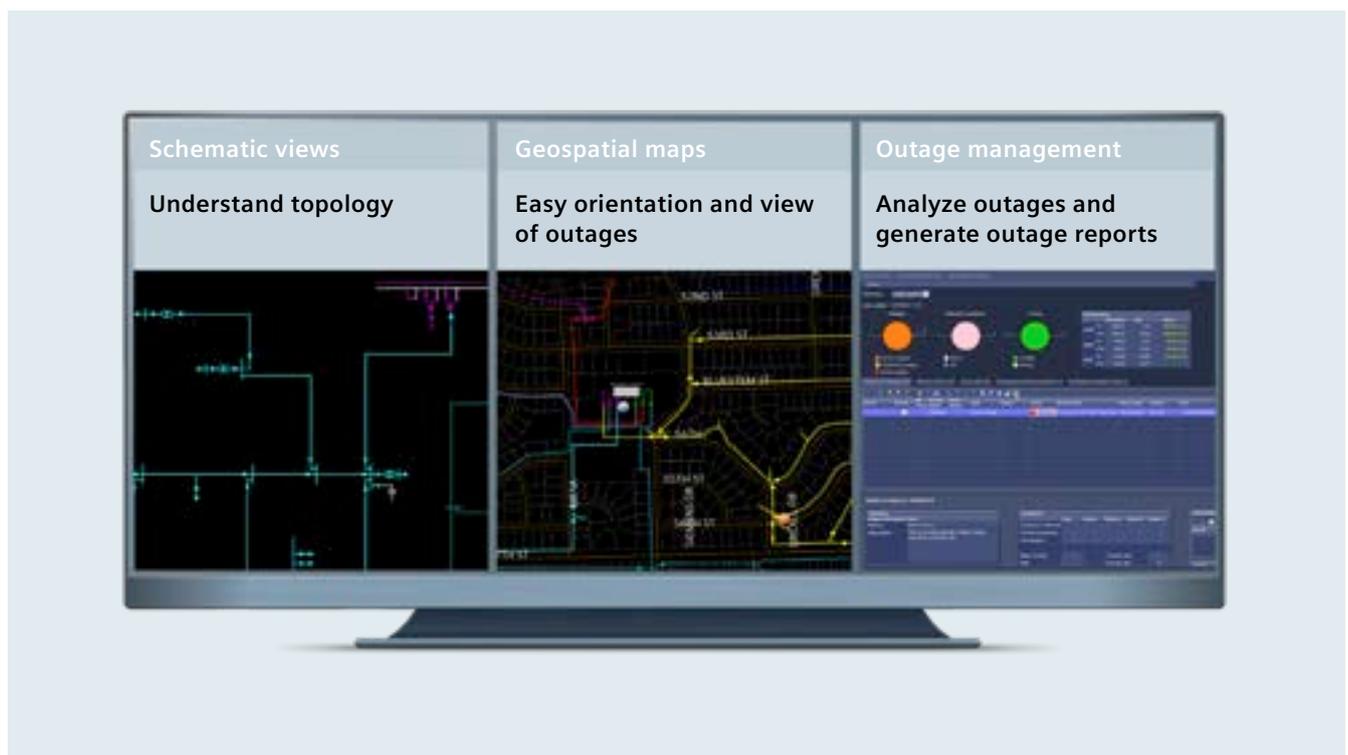
Business-boosting technological innovation

Efficiency is the name of the game in today's business environment – and Spectrum Power™ ADMS is the ideal solution for staying ahead. Because it leverages a single integrated software solution, Spectrum Power™ ADMS enables optimized workflows and simplified operations. Outage restoration times are reduced thanks to the seamless interaction of various applications, and easy integration of GIS data using CIM standards (IEC 61970 and 61968) means data maintenance is cost-efficient. All in all, you will benefit from increased asset utilization and optimized network load with minimized losses.

Everything just one click away

Spectrum Power™ ADMS is characterized by its unique Common User Environment, enabling operation of all ADMS functions from a common Web-based user interface. Under a common geospatial visualization tool, it integrates the distribution SCADA operation, the complete work and outage management process, and the use of the entire suite of advanced applications. By combining this unique Common User Environment with a component-based architecture, Spectrum Power™ ADMS provides a flexible configurable environment for advanced grid management that is compatible with different market requirements.

Leading through one Common User Environment



3-in-1 solution

Monitor & Operate

Enable safe monitoring and control of the electrical distribution network for operations personnel



Increased operational efficiency with SCADA

Thanks to SCADA functionality, Spectrum Power™ ADMS comprises everything you need for monitoring, alarming, measuring, calculating, or controlling power systems. Extended SCADA functions within the Spectrum Power™ ADMS system are improved by advanced topologic coloring and

extended tracing, including for outages and trouble calls (single-phase and three-phase distribution networks); online-editable Temporary Network Elements; easy Switching Procedure Management; and flexible Load Shedding. In this way, you have a complete overview of and control over your network.

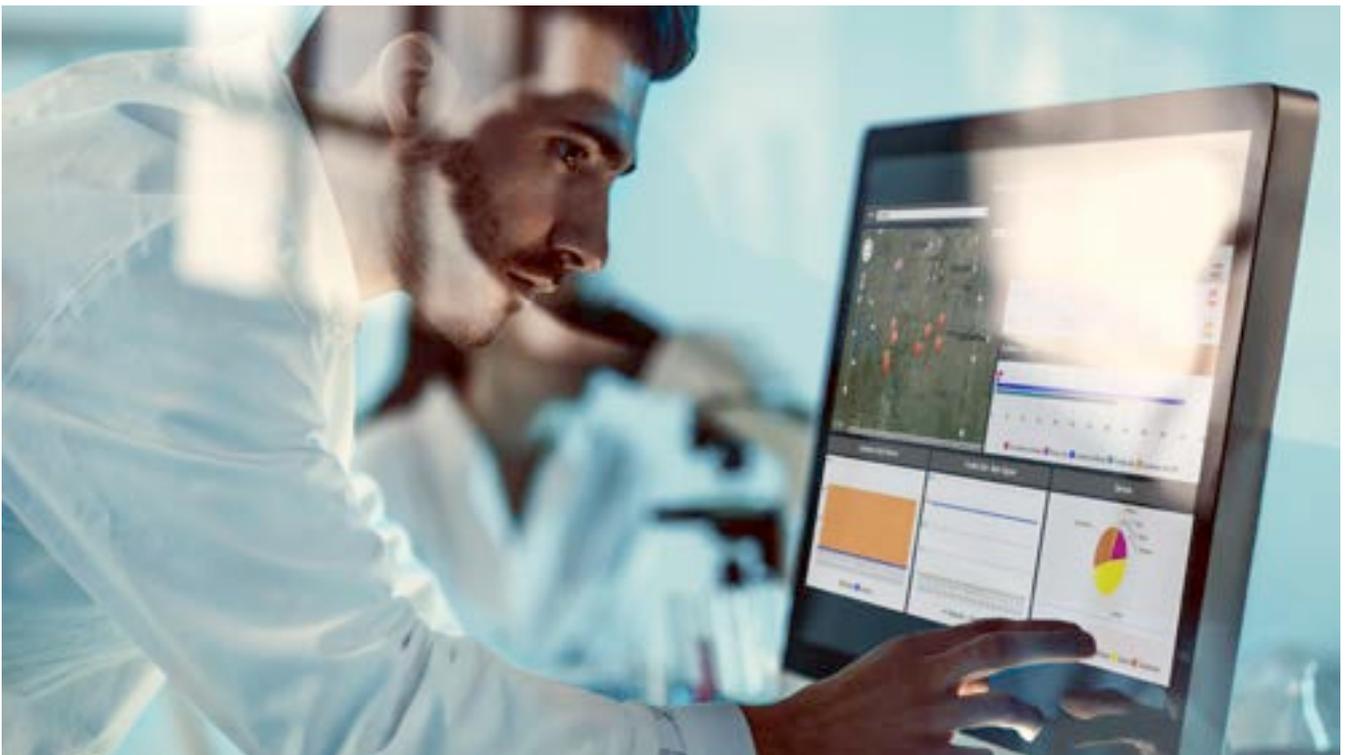
Flexible architecture for external interfaces

Featuring Service-Oriented Architecture (SOA), Spectrum Power™ ADMS brings IT and OT together for coordinated decision-making and operations, while enhancing operational efficiency and reliability. It is also able to make use of other IT systems, so you have access to a range of services within the network control system. Standardized processes as well as interface and messaging specifications based on IEC 61968 and IEC 61970 standards ensure trouble-free data exchange between the systems. Spectrum Power™ ADMS thus becomes an integral part of the heterogeneous IT system landscape and your operational processes – optimizing both power supply and communication.

Easy business and regulatory reporting

Spectrum Power™ ADMS supports full Java Database Connectivity™ (JDBC) and Open Database Connectivity™ (ODBC) for easy integration of any reporting tool, for instance Crystal Reports or Jasper-Reports, to report historical data. Archiving features such as compression and on-the-fly and persistent data aggregation and calculation are provided, as well as data analysis tools, an audit trail, and charts and trends. The archived data can be leveraged for outage management indices, periodically or on request, for one or more selected criteria.

Full network transparency at a glance





3-in-1 solution

Analyze & Optimize

Reduce network loading at peak times
and increase network efficiency and reliability



Comprehensive application suite

Spectrum Power™ ADMS provides the tools you need to analyze the complete network and optimally use its assets. It encompasses an application suite – Distribution Network Applications (DNA) – that includes automated Fault Analysis, Network Analysis, and Load Forecast.

These applications are used in real time to support the operator in assessing the state of the entire network, in improving the normal operation of the network through

control optimization, and in resolving abnormal network conditions such as network faults or security violations. As an added benefit, these applications can also be used in study mode to support the operator in planning network reconfiguration for minimizing possible service interruption time and to evaluate alternatives in corrective or preventive strategies.

Stable grid operation through targeted monitoring and fast control

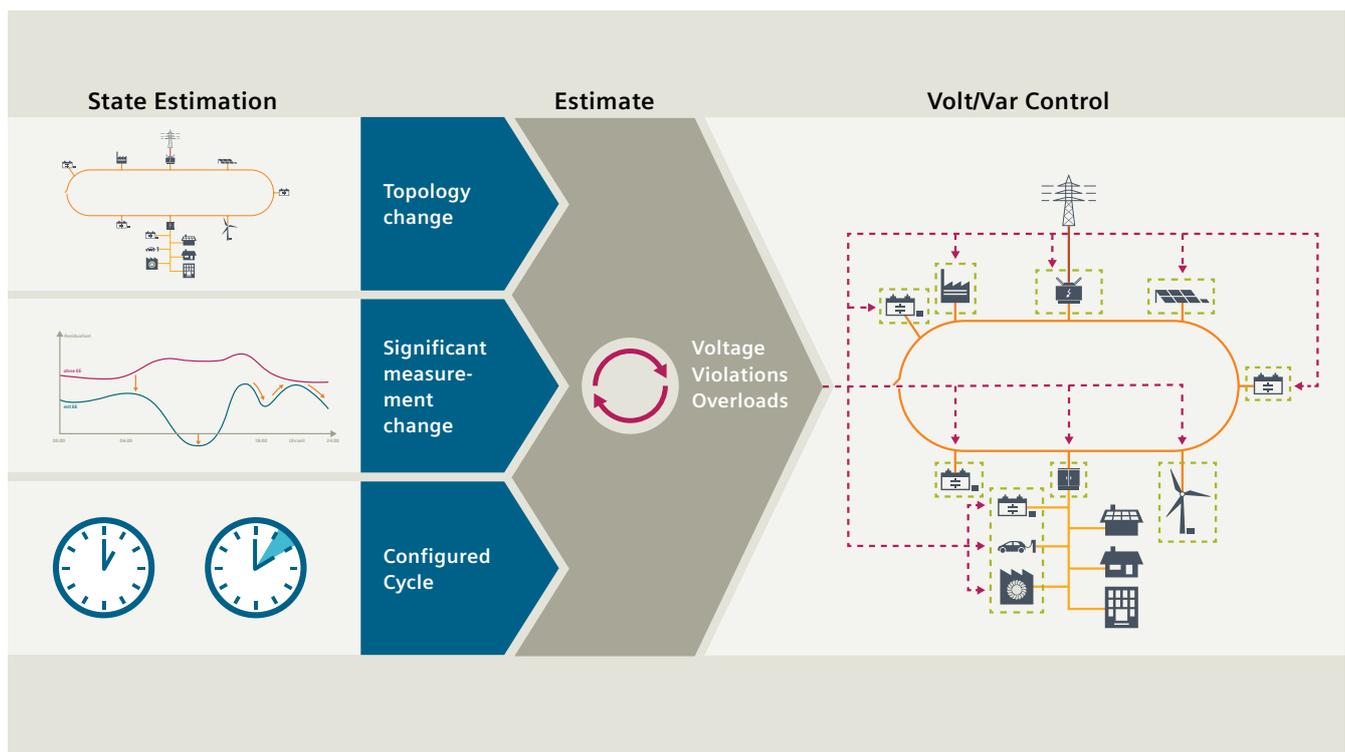
Processes in the distribution grids must be made visible at all times in order to reliably assess the status and take efficient countermeasures before critical situations arise. Spectrum Power™ ADMS with integrated Active Network Management is a smart solution for distribution grids that supports a wide range of equipment – from transformer tap changers and capacitor banks to controllable loads and generators, including battery storage.

- Load flow values and load flow directions are reliably monitored. Voltage violations and equipment overloads are detected quickly and accurately.

- Voltage range deviations and asset overloads are recognized quickly and securely.
- Balancing measures primarily for maintaining grid stability and for protecting equipment can be initiated at an early stage.
- Distribution losses can be effectively reduced.

An automatic mode allowing transformer tap changers, capacitor banks, loads, and generators, including battery storage, to be controlled without operator intervention has been tested in reference installations.

Spectrum Power™ ADMS with integrated Active Network Management





3-in-1 solution

Track & Restore

Proactively and safely guide operators when needed most, for instance during storms and outage restoration activities



Full-feature outage management

With the aim of reducing fault location and service interruption time, Spectrum Power™ ADMS outage management is responsible for a range of functionalities: for merging outage information from all available sources; identifying the nature of the outages, including fault locations and affected customers; dispatching the crews to restore service and make appropriate repairs; and developing all necessary switching procedures. It includes trouble call management,

crew management, and customer notification. Comprehensive outage/work analysis and switching order capability work with a range of other functionalities to process trouble calls, verify the fault, and automatically calculate the Estimated Time to Restore (ETR). A sophisticated storm mode is also integrated, which can process large numbers of trouble calls from customers and smart meters, and helps to guide the operator during optimized restoration activities.

Mobile OM

Integrated Mobile Outage Management (Mobile OM) brings the mobility and flexibility that is required for crews to handle the upcoming workload efficiently. Mobile OM supports the dispatch of work orders, optimizes the workflow, helps to execute switching procedures, or provides the means for efficient mobile damage assessment. Field crews can easily exchange text messages or files with the control room to obtain increased visibility and quick response times.

Convenient GIS data import

Benefit from cost-efficient data maintenance with Spectrum Power™ ADMS, which enables easy integration of Geographic Information System (GIS) data using the CIM standards IEC 61970 and IEC 61968. GIS Smart Integration enables your GIS to be the distribution network's source master. Using an advanced incremental process, operational network data modeled in the GIS is imported periodically or on request for added flexibility, and is conveniently synchronized with model changes in the GIS. GIS Data Import Management (GDIM) allows the initial bulk import of all the data from your GIS or incremental updates. To ensure fast navigation and simplified workflows, the geospatial user display is fully integrated in the Common User Environment. Operator changes (like jumpers) will remain valid following incremental updates.

Handle crews more efficiently



Flexibility and security for today's business world

Easy enterprise integration

Enterprise integration with external systems – such as Geographical Information System (GIS), Customer Information System (CIS), Interactive Voice Response (IVR), Advanced Metering (AMI), Workforce Management (WFM), and Asset Management Systems (AMS) – is an integral part of Spectrum Power™ ADMS that is made possible by the CIM-based Service-Oriented Architecture (SOA) framework. This feature provides integration with GIS (network data) and CIS (service point data), with CIS/IVR (trouble calls from call centers and automated systems), AMI/MDM (statuses and data from Smart Meters), AMS (planned work orders), and MWFM (either as Mobile Device Management or Mobile Workforce Management). Middleware transparency and flexible configuration interfaces for the Spectrum Power™ ADMS components ensure that integration into your existing enterprise IT is easy.

More flexibility and choice for you

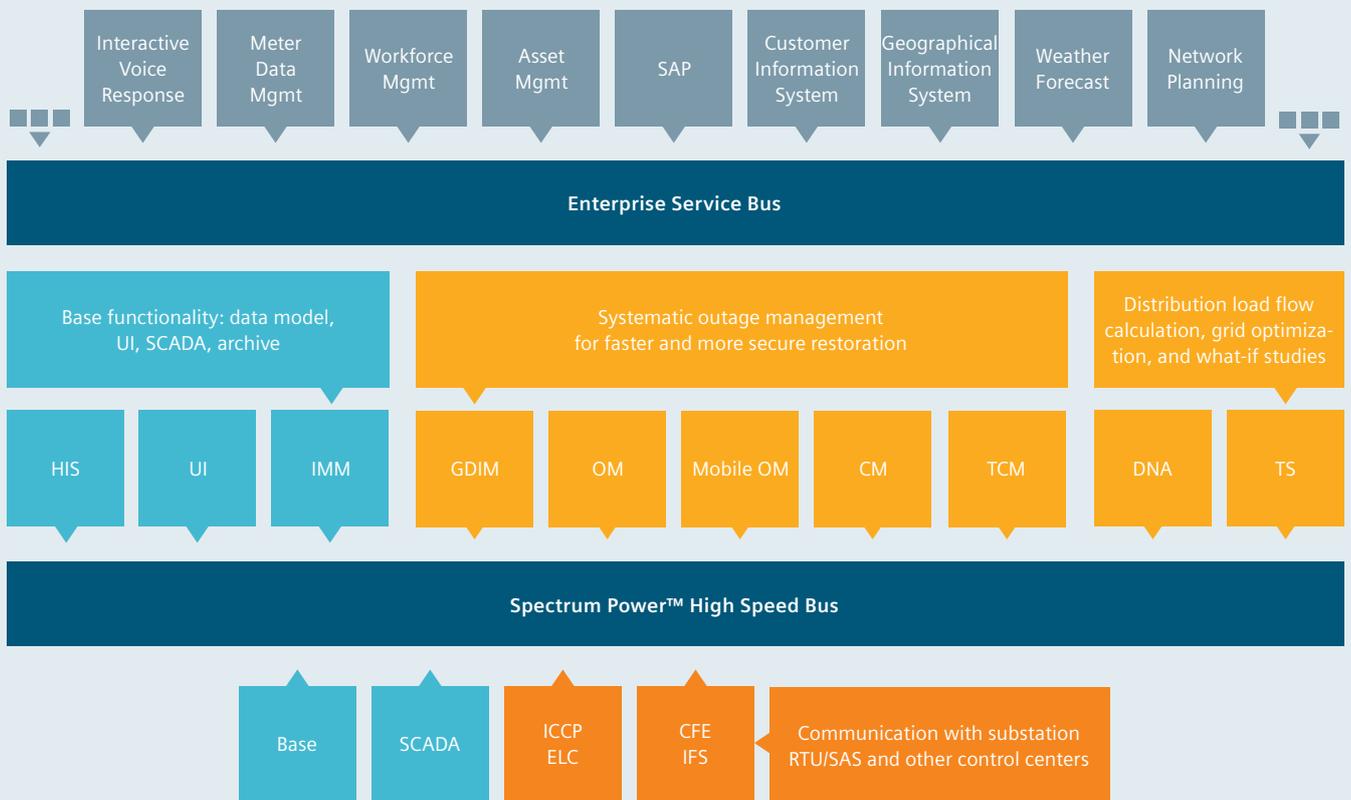
Because it supports the Linux operating system with open-source, 64-bit architecture, Spectrum Power™ ADMS offers independence from potentially costly hardware vendors – and flexibility for you. A broad choice of hardware means you can choose the devices most suitable for your company's purchasing strategy. Spectrum Power™ ADMS also adheres to the architectural paradigms of an SOA for easy and seamless integration into your existing IT application environment. As a result, the investments you make in software and hardware retain their utility and value for many years to come.

Full security support

Seamless integration into your enterprise IT landscape has many advantages, but it also makes the system more vulnerable to cyber-attacks. Because of the essential role of electrical power in our economy and lives, power utilities are an important national cyber-security asset. Through all the details of this process, Siemens is committed to helping you achieve compliance every step of the way. Spectrum Power™ ADMS provides the tools and mechanisms you need to meet the highest security requirements – including those of the NERC CIP (North American Electric Reliability Corporation Critical Infrastructure Protection) and the BDEW Whitepaper (German Association of Energy and Water Industries).



Open CIM-based Service-Oriented Architecture and a powerful set of applications



- CM** Crew Management
- DNA** Distribution Network Applications
- GDIM** GIS Data Import Management
- HIS** Historical Information System
- ICCP** Inter-Control Center Communication Protocol
- IFS** Independent Frontend System

- IMM** Information Model Manager
- OM** Outage Management
- TCM** Trouble Call Management
- TS** Training Simulator
- UI** User Interface



**Published by
Siemens AG**

Smart Infrastructure
Digital Grid
Humboldtstrasse 59
90459 Nuremberg, Germany

**For the U.S. published by
Siemens Industry Inc.**

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Article No. SIDG-B10026-00-4AUS
Dispo 06200 tb A-17001 WS 01 19
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