
Embracing the future takes ability. ABB Ability™.

Next generation electrification solutions,
from substation to the point of consumption.

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Additional information

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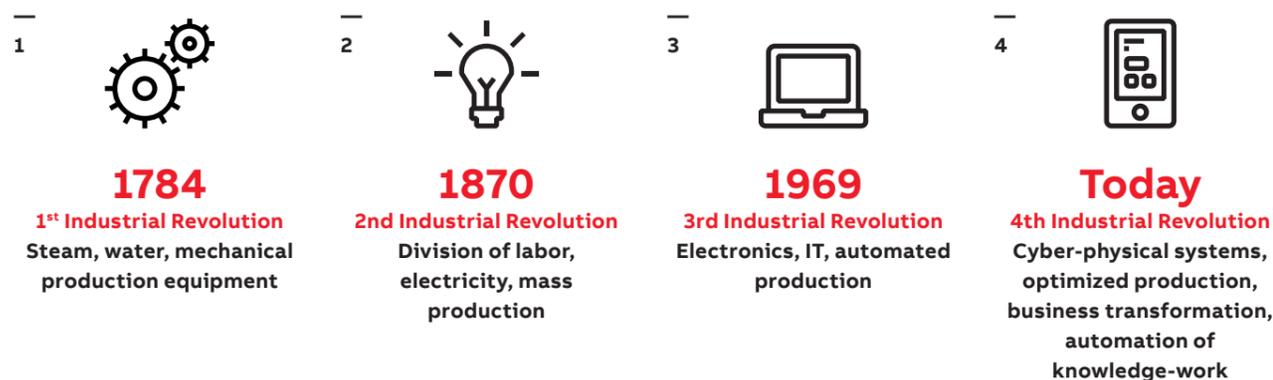
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The impact of digitalization

We are in the middle of a revolution that will change the way we see the world. Driven by an explosion of data, computing power and connectivity between machines and people, the 4th Industrial Revolution will fundamentally alter the way we live, work and relate to one another.

The shift from simple digitization to innovation based on combinations of technologies and data is forcing companies to change the way they operate.

The application of the Internet of Things to virtually every industry is challenging what it means to be connected: sensors are becoming ubiquitous, machines talk to us – and each other – and data is more readily available than ever.



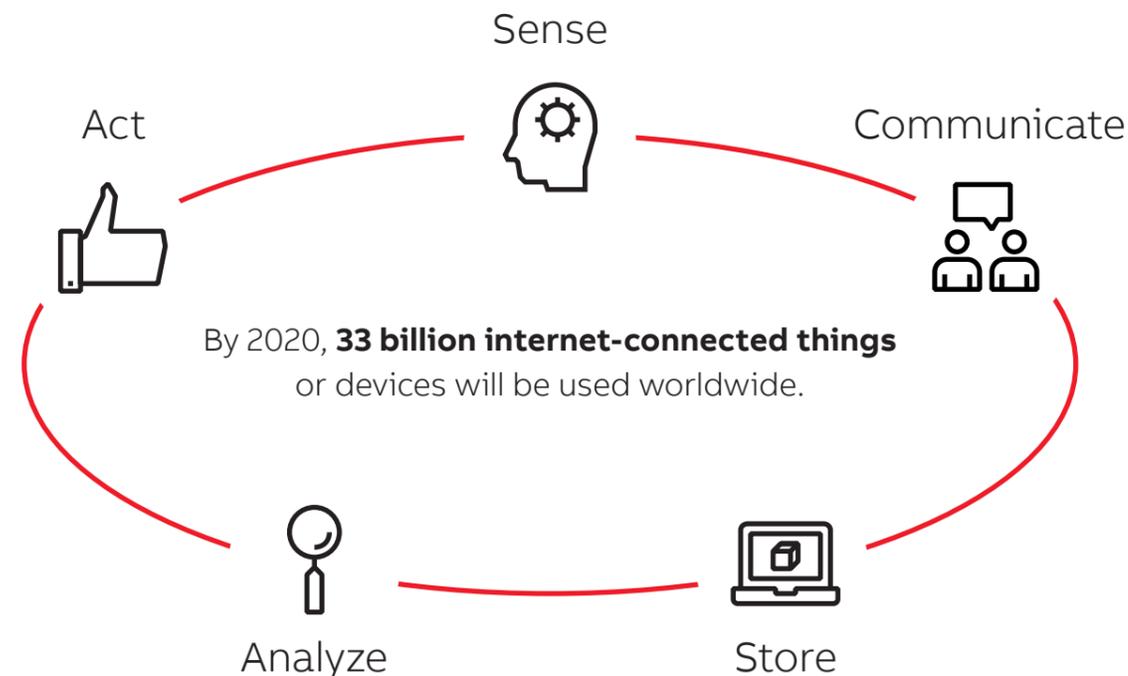
In today's rapidly evolving world, nearly all aspects of daily life are touched by smart products or devices to monitor, control, optimize and operate systems that we rely upon, some of which adapt autonomously to a changing environment.

The ever-decreasing cost of sensing, data storage, communication and computation means that very soon, almost any "thing" that can be connected, will be connected (to other devices on a local network and increasingly, to the cloud). The potential of the Internet of Things is realized when we can sense, communicate, store, analyze, and act on the physical world.

By 2020, an estimated 33 billion internet-connected things or devices will be used worldwide¹. That is on average 4.3 connected devices for every person on the planet. Each connected device is equipped with sensors, computing power and software.

ABB is no stranger to this concept, having provided industry with a broad portfolio of products to automate and control mission critical infrastructure and processes worldwide. For more than 40 years, that has meant building software and connectivity into our devices and systems. With an installed base of more than 70 million digitally enabled connected devices, 70,000 digital control systems and 6,000 enterprise software solutions, we are well positioned to help our customers capitalize on the efficiency and performance improvements that digitalization can deliver.

As the 4th Industrial Revolution gathers momentum, ABB is continuing to develop solutions that connect our customers to the power of the Internet of Things and, through our services and expertise, going further by turning data insights into the direct action that "closes the loop" and generates customer value. Our intelligent solutions unlock new opportunities to reduce downtime along with the need for manual inspection and testing, lower energy or fuel consumption, lower maintenance effort, increase resource efficiency, elevate performance, and improve productivity via enhanced uptime, speed and yield.



¹ Cisco Visual Networking Index (VNI)

Introducing ABB Ability

With our unmatched digital industrial experience, we understand that harnessing the 4th Industrial Revolution requires bridging the physical and digital worlds, not focusing exclusively on either one.

ABB Ability embodies this approach, with devices, systems, solutions, services and a platform that enables our customers to know more, do more, do better, together.

ABB Ability combines our deep domain expertise and connectivity capabilities. It is a collection of all the ABB solutions that are connected or software-enabled, including but not limited to, those on our cloud platform. For a number of solutions, ABB Ability leverages Microsoft Azure to provide an open, globally available, digital-industrial ecosystem for customers, partners, suppliers and developers.

Deep domain expertise



20+ industries



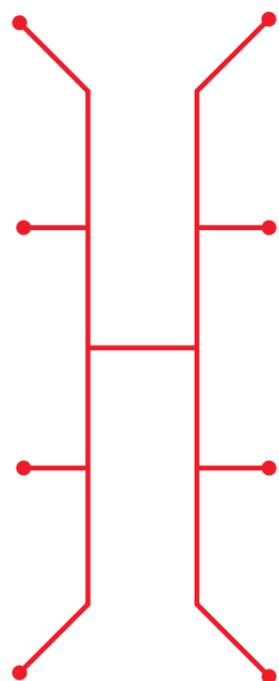
40 years of experience



Global leadership



No. 1 in control systems and industry automation



Connectivity capabilities



70 million digitally-enabled devices



70,000 digital control systems



6,000 enterprise software solutions



World leader in securing and using data



ABB Ability and electrical distribution: benefits for our customers

Digitalization offers businesses improved efficiency and growth. ABB intelligent solutions provide actionable information derived from the analysis of data gathered from connected devices, enabling our customers to be more productive and make better decisions.

Connected solutions deliver improvements in uptime, speed and yield, while also enabling new business models and the ability to expand into new markets.

ABB Ability offers a common platform of solutions, providing security, integration and scalability. Third party products can easily be added, as the platform is built with Microsoft Azure. As there is no data or system lock-in, customers are able to operate in the most flexible manner. The network effects of a cloud-based industrial ecosystem provide access to industry-level and cross-industry data, making best-practice benchmarking easier for all. Overall, our connected solutions bring about a transparency into operations, from the device to the enterprise level.

This flexibility and transparency is balanced with our strong commitment to data security and privacy. To ensure that your data will always be secure, all of our products and solutions, along with the ABB Ability platform are rigorously tested in line with our data guidelines.

In the area of electrical distribution, ABB Ability offers three key benefits:

1. Ease of doing business... with digital information and tools to enable product selection, configuration, order management and commissioning.
2. Increased functionality... including connectivity and integration between products and systems so that individual solutions can do more within the same footprint.
3. Improved productivity... across a whole site or electrical system due to remote service delivery for energy monitoring, controlling, management and predictive maintenance.



Real world applications

The remote monitoring of connected devices or solutions has obvious benefits regarding maintenance and service, especially for devices installed in isolated or dangerous locations.

Imagine an offshore wind platform: it is clear that by reducing maintenance and service to an optimal frequency, money and time can be saved. Products and solutions that can communicate their status of operation and their maintenance or service needs so that the right service engineer, with the right part, can be dispatched just in time, extends a product's lifetime and prevents expensive shutdowns. This provides obvious productivity gains.

Smart devices can be connected more easily today to individuals anywhere in the world, making the management of processes more effective. With the development of mobile communication devices and wireless connections, connecting devices to the internet is trivial, which is why around 5.5 million new "things" are being connected every day.

By connecting, controlling and monitoring many products or solutions, significant data can be gathered on each elements' performance, working alone or together with others, which will enable system optimization through the analysis of current and historic data.

Data gathered on the operating characteristics of products and solutions helps our customers to identify exactly how that product is used. This also provides vital feedback to the designers who use that data to hone a product's capabilities to a customer's needs, optimizing performances, increasing the service intervals and stripping out unnecessary functionality. This concept can be taken a step further so that specific products can be tailored to specific applications, creating more value for customers by responding to segment specific product usage patterns.

Although each of these capabilities is revolutionary in themselves, it is not until all are combined that the full power of the Industrial Internet of Things is unleashed. When products are able to monitor, control and optimize their own performance, autonomous adaptation to their environment becomes possible. This means that fine adjustments in individual product behavior can help to optimize the performance of an entire system. The energy efficiency of an electric grid, for example, increases with the addition of more connected smart meters. They enable a utility to respond effectively to power demands through greater awareness of demand patterns obtained from the analysis of current and historic data, which feeds back from the connected smart meters.



With every revolution comes new dangers and opportunities. This new paradigm means that value is being created not only by the individual capabilities or functionalities of a single discrete product, but also in how that product performs in a broader context, such as a smart building, smart home or smart grid.

Largely similar products will differentiate according to their ability to interact with other products, which will allow new and sometimes unexpected partnerships between companies that may once have resided in discrete markets or even between companies that have traditionally been competitors.

One such new partnership is the international joint venture, called Mozaiq, which was set up between ABB, Bosch and Cisco to develop and operate an open-software platform for smart homes.

Interoperability is a major challenge for the Internet of Things, especially in the home where consumers put together collections of devices from different trades and different manufacturers.

Consumers want to combine lighting, heating, household appliances and also their entertainment systems. Mozaiq aims to make that possible regardless of make or brand, to stimulate innovation and diversity in product and service offerings. An electrical installer could, for example, create a very realistic tailor-made presence simulation to be activated when you are away on holiday. The lights in your home could be turned off and on as if you were there, your television too, but all the time your alarm system would be fully armed and able to notify you, a neighbor, or a security company, if anything moved in or around your house, even taking images to help catch the perpetrators.

ABB Ability products and solutions for a safer, smarter electrical flow

Our research into technologies that deliver improved connectivity, protection and energy efficiency for customers of our electrification products and solutions has resulted in a range of leading-edge products and solutions, applicable from substation to the point of consumption.

ABB Ability offerings for electrical distribution:

Ease of doing business provides an improved customer experience:

- e-Design
- e-Configure
- Web tools: Driver Care, Charger Care and Payment

Added functionality that reduces energy costs:

- Circuit Monitoring System CMS-700

Improved productivity with better platform systems:

- ABB Ability Electrical Distribution Control System
- Extended Relion® protection with online user interface and IEC 61850 Edition 2 for enhanced interoperability
- Smart Asset Management for low- and medium-voltage switchgear
- Aurora Vision Plant Management Platform
- VSN700 Data Logger and VSN300 Wifi Logger Card
- Connected Services Platform for EV Charging Infrastructure
- Arctic Product Family
- UniGear Digital Switchgear
- MNS Digital Switchgear
- Compact Power Management Solutions
- Substation Management Unit COM600S



Connectivity

Connectivity links up every part of the electrical flow

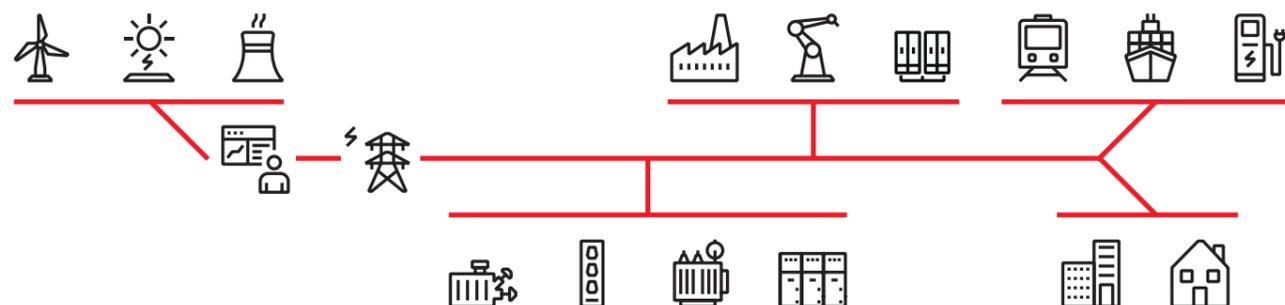


ABB Ability products and solutions for a safer, smarter electrical flow



Extended Relion Protection with Online User Interface and IEC 61850 Edition 2 for Enhanced Interoperability

ABB's celebrated Relion medium-voltage product family offers protection, control, measurement and supervision for power systems. To increase safety, reduce material damage and minimize system downtime, Relion protection relays offer advanced earth-fault protection, detecting faults in any cable and overhead network. To ensure interoperable and future-proof solutions, the Relion products have been designed to implement the core values of the IEC 61850 communication standard. Recently released versions of the Relion product family's relay series also support Edition 2 of the standard, which brings substantial benefits in terms of extended interoperability of the substation devices. Newest Relion protection relays feature support for online user interface and enhanced support for distributed generation with improved power flow control and voltage regulation.



Smart Asset Management for Low- and Medium-Voltage Switchgear

ABB monitoring solutions implement the whole on-site condition monitoring concept in low- and medium-voltage switchgear – from collecting real-time field data to performing assessment algorithms and keeping users up-to-date on the current maintenance requirements. The on-site condition monitoring solution MService for low-voltage and MySiteCare for medium-voltage can be included into the installation during the design phase, but also at the time of operation.

The service team can perform either periodic or continuous monitoring to optimize their operations. MyRemoteCare deploys a unique remote platform for low- and medium-voltage assets to support asset management to identify the critical assets and keep them available, reliable and safe.



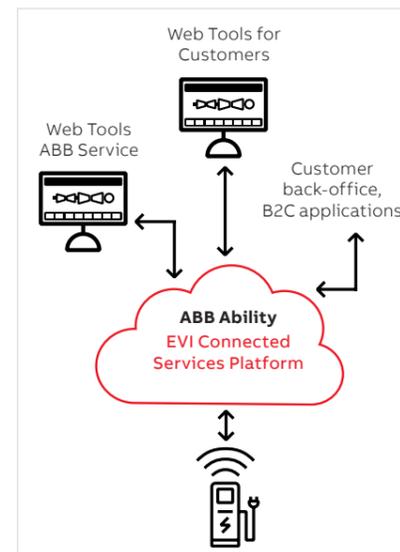
Aurora Vision Plant Management Platform

Aurora Vision is a cloud-based monitoring and management solution for solar PV plants and portfolios. It provides remote performance monitoring and analytics for asset managers and fleet operators and remote device health monitoring and management for service technicians. Aurora Vision improves uptime and overall performance of PV power plants in all market segments, including residential, commercial and utility scale plants. Aurora Vision is available through standard browsers, APIs and Mobile Apps.



VSN700 Data Logger and VSN300 Wifi Logger Card

VSN700 Data Loggers and VSN300 Wifi Logger Cards enable ABB solar inverters and other devices to be remotely and securely managed by Aurora Vision Plant Management Platform. The data loggers provide local data storage when internet access is unavailable. Local integration is supported with third-party solutions over Sunspec Compliant Modbus TCP. Support also includes plug&play installation services with an integrated web server for system settings.



Connected Services Platform for EV Charging Infrastructure

ABB's cloud-based Connected Services Platform is a secure state-of-the-art application connecting thousands of charge points globally.

Operators can use the platform to access their charge points in real time via ABB web tools or APIs. Web tools are a simple and cost efficient way to support professional network management and service operation, while APIs allow for a smooth integration to back office solutions such as billing systems and power management applications.

The Connected Service Platform is used to efficiently distribute software updates, which is crucial in a dynamic industry with constantly evolving standards and protocols. The Platform is connecting to almost 100 different back office solutions and is based on a highly redundant architecture.

The GSM (Global System for Mobile) connectivity to the chargers is monitored 24/7 by ABB's Network Operation Center, which reacts proactively when something goes wrong. This approach guarantees a stable and secure operation of charging networks – which is key for commercial success.



Arctic Product Family

ABB introduces the Arctic Product Family for secure, reliable and real-time wireless connectivity for all industrial and utility applications to enable remote, real-time grid automation. As the backbone for communication, the Arctic family utilizes operator-independent public cellular networks, to combine the products into secure, cost-effective wireless communication systems. The Arctic product family includes wireless routers and gateways as well as M2M gateways. The products allow access to geographically remote assets to support utility customers in building more intelligent distribution networks and promoting an increasingly interconnected world.

ABB Ability products and solutions for a safer, smarter electrical flow



Medium-voltage digital switchgear

As a part of the ABB Ability portfolio of connected solutions, digital switchgear combine protection, control, measurement and digital communication to enable a safe, flexible and smart electrical network that can deliver power reliably and efficiently. The optimized integration of current and voltage sensors is combined with the latest Relion protection and the capability of the IEC 61850 standard for communication. A high-performing digital switchgear solution safeguards the distribution of power and ensures production uptime. A perfect match for meeting strict energy requirements, it offers great flexibility, energy-efficiency and minimized maintenance needs. The portfolio includes both air- and gas-insulated switchgear with the UniGear Digital and ZX Digital product families.



Low-voltage digital switchgear

An innovative solution for low-voltage switchgear, MNS Digital enables operators to collect and view real-time data from across their electrical operations. With seamless connection to the DCS and/or ABB Ability platform, system data can be quickly collected and analyzed in one place. This enables operational cost savings of up to 30 percent within electrical systems through improved continuous operation, energy management and predictive maintenance capabilities. By having full transparency over their electrification solution, operators can avoid downtime, prioritize investment and optimize their electrical system and assets ready for the power demands of Industry 4.0. MNS Digital technology is also available as an upgrade for legacy installations.



Compact Power Management Solutions (cPMS)

cPMS is a compact, off-the-shelf solution to power management. Using ABB's Relion protection and control devices, it is created with small- to medium-sized industries and critical infrastructure in mind. A power management system is essential for the safe, efficient and reliable operation of a power system, including operations such as load shedding, generator control, power sharing, network synchronization and power restoration. cPMS is based on PML630, the master unit of the power management system and is fully integrated with Relion 630, 620 and 615 series protection relays, RIO600 IO units and COM600S.



Substation Management Unit: COM600S

COM600S is a versatile substation automation and data management unit. On top of a digital switchgear, it enables smart solutions for utility or industrial medium-voltage distribution substations. COM600S performs the combined role of a user interface (WebHMI), a communication gateway (multi-protocol connectivity) and an automation platform, running real and non-real time applications in a single physical unit to facilitate substation operations, data management and analytics.

³ = compared to typical substation with 14 switchgear panels of UniGear ZS1 type over 30 years of operation