

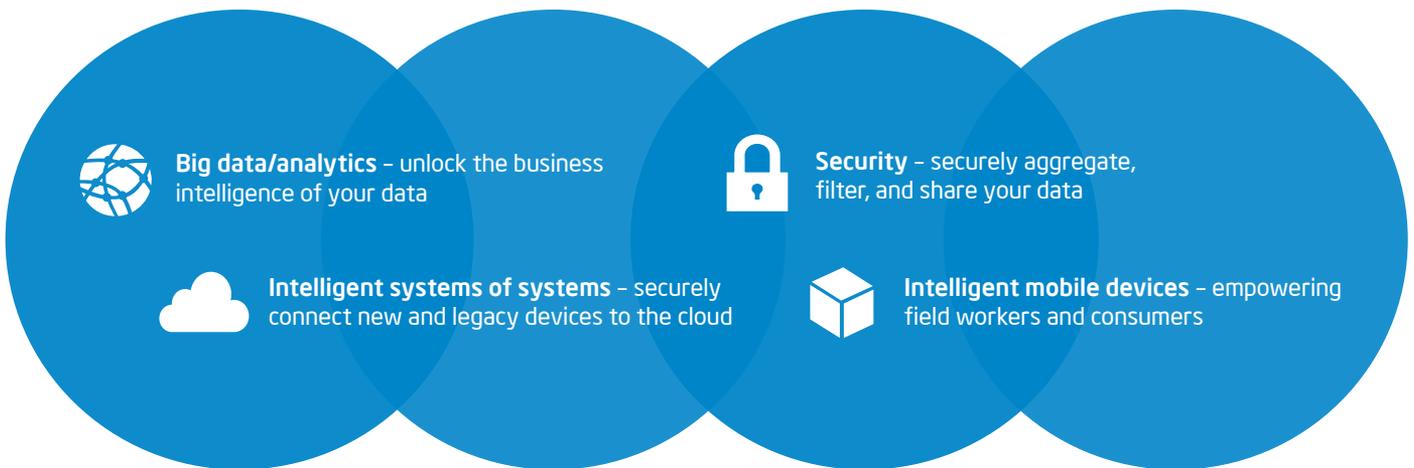


Intelligence from
the data center
to the edge.

The Internet of Things starts
with intelligence inside.

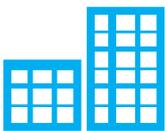


Modernizing the grid depends on ensuring end-to-end connectivity, reliability, and security—from generation and transmission to distribution and consumption. Intel is helping to support this transformation by developing hardware and software building blocks that harness the power of the Internet of Things (IoT) and the cloud to bridge traditional IT and operations, turn data into knowledge, and integrate intelligence across the grid.



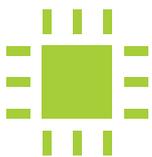
Intel across the grid

Intel, McAfee, and Wind River are working collaboratively with industry technology partners to help build a smarter grid. From security to the cloud to data analytics, we are addressing a range of industry needs in our commitment to help the industry advance. Learn more in the project spotlights below.



Intelligent Electrical Grid Infrastructure—Sustainable Smart Cities

Intel is developing intelligent platforms and software that seamlessly integrate into existing energy infrastructures to create a more secure, reliable, and efficient grid. Intel® technology-based intelligent gateways make existing secondary substations connected and intelligent, so they can monitor energy transmissions on low-voltage networks, aggregate data from disparate sources, and apply analytics to support better decision making, greater reliability, and lower TCO, CAPEX, and OPEX.



Distribution Transformer Analytics using Intel® Distribution for Apache Hadoop* and SAP HANA*

Pecan Street, Inc.'s smart grid development, collects data from four instrumented power distribution transformers, more than 200 solar photovoltaic systems, and more than 50 electric vehicles. In addition, each sensor-equipped Pecan Street home contains a connected energy data router that measures circuit-level energy use in one-minute intervals. These large field research datasets are sent to servers located at the Pike Powers Lab & Center for Commercialization, which hosts Intel® Distribution for Apache Hadoop* (IDH software). Storing multiple large datasets within IDH and analyzing them with SAP HANA* for planning and maintenance purposes offers numerous benefits.



Security Connected Framework for Critical Infrastructure

Power grid infrastructure requires more than network security. The applications and platforms themselves must also be protected and monitored to sufficiently protect power grids from cyber attacks. Integrated security technologies from Intel, Wind River, and McAfee provide comprehensive, embedded-to-enterprise security for the smart grid to protect all platforms, applications, and data required for intelligent operations. This industry's first integrated, embedded security solution is currently in Department of Energy field trials in Texas, protecting synchrophasor network applications from Electric Power Group (EPG). The Security Connected Framework delivers connectivity, application and platform security with monitoring and management, and also conforms to NIST and ENISA recommendations, as well as NERC-CIP requirements for security event logging and auditing.



Mobile Workforce Solutions

The ability for field technicians to securely access and share information in real time greatly improves situational awareness, which ultimately drives greater efficiency and system reliability. To meet that need, Intel® Core™ vPro™ processor-based platforms from Panasonic and Motion Technologies have been combined with IBM Maximo Asset Management* software and TC Technology's Mobile Information Management System*. The move equips mobile workers with the tools and real-time information to be safer and more productive in the field, while improving energy system reliability, security, and customer service.



Secure Substation Architecture

Intel is working with Red Hat to address key NERC CIP reliability requirements for transmission and distribution in the smart grid, with Red Hat delivering secure infrastructure and applications for utility transmission, distribution, and grid architectures. Building on open source and standards for security, manageability, scale, connectivity, and interoperability, Red Hat has defined reference architectures for secure substation automation as well as field device and grid connectivity encompassing meters, energy generation assets, storage, and the communication fabric of the smart grid.



Internet of Things Smart Building

Intelligent gateway solutions for the IoT family of products from Intel, Wind River, and McAfee deliver integrated intelligent gateway solutions that enable users to harness the building sensor data to increase efficiency, security, and reliability. Utilizing data from wireless sensors, the intelligent gateway automatically controls lights and sends data via the cloud to back-end servers that aggregate and analyze energy-use data to discover ways to operate the building more efficiently. Intelligent building automation allows companies to monitor energy consumption, automate and control usage, and incorporate additional security features.



Cloud-Based Telematics for In-Vehicle Information

Running on an Intel® processor, the NEXCOM VTC 1010* in-vehicle computer enables bus drivers, passengers, and remote support engineers to monitor, optimize, and understand electric bus performance. The connected system captures and displays a wide range of data in real time, including vehicle speed, location, remaining battery capacity, voltage, revolutions per minute, and CO2 emissions compared to gas vehicles. Plus, it transmits collected data via the cloud to back-end servers where it can be analyzed to diagnose mechanical issues, gauge driving performance, and discover other insights.



Intel® Puma™ 6 Services Gateway: An Enabling Platform for the IoT in the Home

The Intel® Puma™ 6 services gateway intelligently connects smart appliances, sensors, and other connected systems in the home to the cloud to become the central hub of streamlined computing services for a smart home. It provides a robust, virtualized framework that can consolidate and remotely manage multiple services on the same home gateway—establishing a game-changing business model that enables utilities, telcos, and cable and other service providers to lower capital and operating expenses while deploying new customer services and collecting valuable end-user data. The Intel Puma 6 services gateway can simultaneously provide home automation, home security, energy efficiency, and entertainment services through a secure, standards-compliant, intelligent gateway.

To learn more about these technologies and how Intel is working to increase intelligence throughout the grid, visit: www.intel.com/energy