Industry 4.0 Enables Intelligent Manufacturing

Smart factories leverage converged ICT network and application resources for implementing intelligent business operations that comply with the Industry 4.0 model.

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Industry 4.0 is a strategic initiative that converges the manufacturing industry with high-level information by transforming networks, intelligent technologies, and new services. Renowned manufacturers, such as Siemens, Bosch, and SAP, have each contributed their own ideas for smart factory advancement of Industry 4.0 by pioneering a series of innovations in enterprise management, business models, and production methods. Huawei and China National Software and Service Co., Ltd., (CS&S, or ChinaSoft) are combining resources with their respective advantages to apply Industry 4.0 practices in the manufacturing industry of China.

From Digital to Intelligent

CS&S is a leading ICT solutions provider in China, The company is both well-positioned and possesses the expertise to develop cutting-edge solutions for transforming factory production and operations platforms from “digital” to “intelligent” across many industries, including manufacturing and finance. Guided by Industry 4.0 best-practices, CS&S has chosen the manufacture of tobacco as a pilot industry, and has brought together a team of experts to research and develop a “smart factory” tobacco solution.

Huawei is also in the business of developing smart factory solutions by leveraging the convergence of Big Data, Internet of Things (IoT), mobile Internet, and Social Networking Services (SNSs) resources into a unified network and application system. The convergence enhances data aggregation and analysis that, in turn, alert, report, and trigger intelligent business actions. To remain competitive, manufacturing companies must be relentless in pursuing integrated, smart automation and digitalization of their production factory concepts.

Huawei began exchanging ideas with the CS&S expert team in September 2014 on how to best apply Industry 4.0 concepts to manufacturing practices for tobacco factories. The result was a strategic partnership between the two parties in intelligent manufacturing where CS&S brings the advantage of strong customer relationships with industry leaders clearly committed to fulfilling the Industry 4.0 strategy, and Huawei brings extensive technical expertise in agile networks, enterprise Long-Term Evolution (eLTE) wireless, and Big Data analytics.
Key Technologies Make Smart Factories

Smart factory solutions leverage the following key Huawei technologies:

- **Agile Networks**

  Industry 4.0 is based on the Cyber-Physical Systems (CPS) that will pose a continually increasing set of requirements for timeliness, scalability, mobility, and user experience. Huawei’s Agile Network is designed to enable smart factory staff to control and streamline manufacturing activities and procedures via networks of widely distributed sensors, servers, and storage. Wired and wireless network convergence brings the additional advantages of easier network Operation and Maintenance (O&M) and the capacity to virtualize the control and resource allocations of the network, the applications, and the storage platform. This agile network delivers high service mobility by design. The goal is to ensure a consistent user experience regardless of employee location, device, or network access mode.

  The Huawei S12700 Series Agile Switches provide core facility switching designed for the long service lives required of forward-looking, next-generation network deployments. The S12700 switches: 1) provide embedded wireless Access Controllers (ACs) to centrally forward wired and wireless services, and 2) manage Access Points (APs) and wired access switches.

  The Huawei Agile Network enables the CPS to communicate between the logical and physical systems within the tobacco production factories to assure security and reliability. Huawei’s proprietary Packet Conservation Algorithm for Internet (iPCA) provides quality awareness and accurate fault location for the entire network by enabling bit-level measurement on each agile component. Packet conservation means that the number of packets leaving a system from the transmission port of the network, link, device, or card equals the number of packets arriving to the target destination. If the system traffic is compliant with the packet conservation counter, packet transmission quality is ensured, and packet loss does not occur. iPCA enables network administrators to monitor CPS network quality, detect potential faults, and provide correction in a timely manner.

- **eLTE**

  Huawei’s eLTE solution provides all of the IoT requirements to implement factory-wide wireless coverage. The eLTE solution deploys the enterprise Core Network System 600 (eCNS600) and Distributed Base Station 3900 (DBS3900) to provide 24/7 uninterrupted network access and support up to 50 Mbit/s upstream bandwidth.

  The Huawei eLTE solution supports IoT requirements for large bandwidth, wide coverage, low latency, and multiple services.

- **Big Data Analytics**
Smart factory solutions are used to analyze vast amounts of service data to support optimal decision-making over manufacturing activities for the purpose of extracting maximum value from the production plant data.

For intelligent data analysis, Huawei FusionInsight provides enterprises with an open Big Data platform to rapidly and accurately parse mountains of data into useful business insights critical to the bottom line. FusionInsight is able to run on standard x86 servers without dedicated hardware or storage devices. The FusionInsight application — consisting of a Hadoop massive data engine and a streaming real-time data processing engine — offers a highly reliable, secure, and easy-to-use O&M system with modeling middleware that enterprises are using to pinpoint value from immense amounts of complex, unstructured data.