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SCADA MARKET

By Components (PLC, RTU, HMI, Communication Systems), **Architecture** (Hardware, Software, Services), **Application** (Oil & Gas, Power, Water & Wastewater, Transport, Manufacturing, Chemicals), and Geography

Analysis & Forecast to (2013 – 2020)



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1 INTRODUCTION

1.1 OBJECTIVES OF THE STUDY

- To segment the SCADA market by components, architecture, application, and geography with detailed classification splits by revenue
- To analyze Porter's five forces in detail along with the value chain analysis of the SCADA market
- To identify major market trends, drivers, and restraints for the SCADA market
- To provide the historical and forecast revenue of the market segments and sub-segments with respect to four main geographies, namely, Americas, Europe, APAC, and Rest of the World (RoW)
- To describe and analysis the new developments in the SCADA market
- To strategically profile the key players in the SCADA market and to comprehensively analyze their core competencies and market shares
- To track and analyze competitive developments such as joint ventures, alliances, mergers, acquisitions, new product/technology developments, and research and development in the SCADA market

1.2 REPORT DESCRIPTION

Supervisory control and data acquisition (SCADA) is an automation system that operates to provide control of the remote devices and also to acquire data from these devices. It is a type of Industrial Control System (ICS), which are computer controlled systems that monitor and control industrial processes on real time basis. Various advanced features such as remote monitoring, remote controlling, and real-time data management are the core features of the SCADA system. It has been observed that SCADA is largely used with oil and gas, power (transmission and distribution), and water and wastewater management industries throughout the geographies. With the recent developments in shale gas extraction and exploration, the demand for SCADA is expected to increase at a higher growth rate. Fracking technology is

used to extract the shale gas and requires a lot of water and chemicals. This leads to huge requirements of wastewater treatment opportunities.

The benefits of SCADA system include reduced labor cost, increased uptime, quality production, accurate quantity measurement, and real time data, which make operations accurate. With the changing technology, the development in the field devices (wireless) will be an innovation for the next generation SCADA systems. The displaying and recording of the various process details in smart phones and capturing the real time information through satellites can be expected from the next generation SCADA systems.

The SCADA market is segmented in terms of components which include programmable logic controller (PLC), remote terminal unit (RTU), human machine interface (HMI), and communication system. The report is also segmented in terms of various applications which include oil and gas, power (transmission and distribution), water and wastewater management, transportation, manufacturing, chemicals, food and beverages, telecommunication, and pharmaceuticals. The SCADA Market is further segmented according to architecture, which includes hardware architecture, software architecture, services; and geography, which includes different regions such as the Americas, Europe, APAC, and Rest of the World (RoW). The cross segmentation data included in the report gives a deep insight about the applications specific for the regional markets.

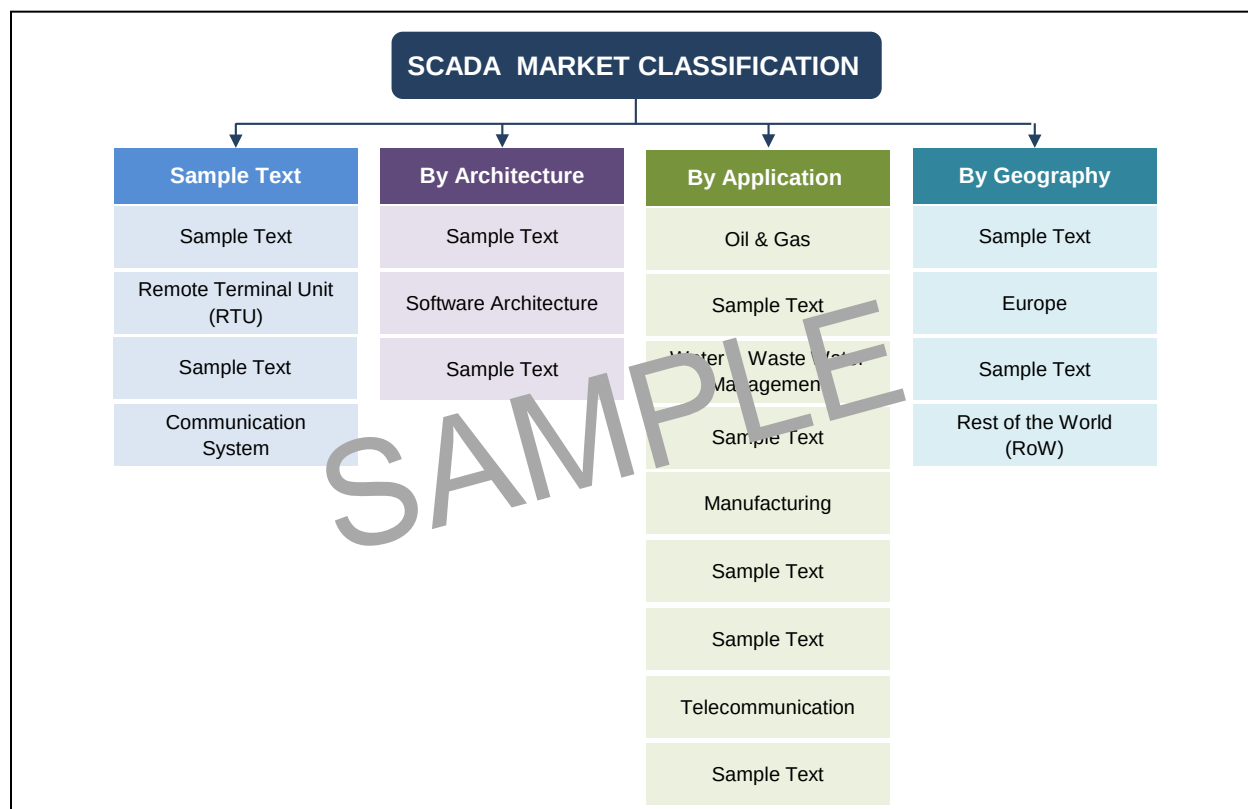
Major players in SCADA market include ABB Ltd (Switzerland), Rockwell Automation (U.S.), and Siemens AG (Germany).

1.3 MARKETS COVERED

The report covers the market considering the parameters from both sides, that is, the demand side and the supply side. The demand side market segmentation includes: various applications and regional split, whereas the supply side segmentation includes: components and architecture. The following diagram shows the overview of the micro-market covered in the report.

FIGURE 1

SCADA MARKET CLASSIFICATION



Source: MarketsandMarkets Analysis

1.4 STAKEHOLDERS

- Components suppliers of SCADA systems
- SCADA software package vendors
- SCADA system integrators as well as SCADA contractors
- Research organizations involved in the development of SCADA systems
- SCADA related solutions and products and services catered by different companies.
- Quality standards organizations, forums, alliances, and associations for SCADA systems

2 EXECUTIVE SUMMARY

Supervisory control and data acquisition (SCADA) is an automation technique which helps in controlling and monitoring the production process, thereby improving the reliability and efficiency of the process. In applications such as oil and gas, power (transmission and distribution), water and wastewater management, and transportation, where operations are in geographically distributed sites, SCADA system finds an extensive application. This is to automate, control, as well as monitor various parameters in the distributed sites using a single connected computer. The requirement and usage of SCADA for different industry varies according to the core functions. For instance, apart from other applications and functions, power distribution requires a very high accuracy with short data response time and in oil and gas industry, the SCADA system can help in detecting any corroded or leaking pipelines before it's too late for a disastrous accident.

The Internet of Things (IOT) and emergence of cloud-based technologies have increased the scope for the SCADA market. Recently, cloud-based SCADA systems and satellite-based communication systems for SCADA systems have been introduced. This has helped in connecting geographically dispersed production facility to communicate with each other and with the central command center. It has been observed that SCADA end-users prefer to have a data on the go which is possible by integrating SCADA systems with smartphones or tablets. The development of these products has enabled the user to control the process through multiple locations without having a physical connection between these devices. Various product ranges are going through uprising innovations for the next generation of the SCADA market.

The need for increase in operational efficiency, high uptime, improved quality along with the quantity, and ease of controlling and monitoring of the industrial process are factors that are helping to develop the SCADA market. Demand for the SCADA systems will be driven by the development of shale gas in the U.S., huge potential from renewable energy sector, and high investments in infrastructure for sectors such as oil and gas, power (transmission and distribution), and water and wastewater management. Cyber security threat and integration data received from oil and gas platform is considered as an important restraint which is being faced by the SCADA system developer and end-users.

3 MARKET OVERVIEW

3.1 INTRODUCTION

Global industries are on a revolutionary state to implement automation techniques in order to reduce cost, increase up-time of production process, and make systems free from cyber threat. The demand for control systems with advanced features such as remote monitoring, remote controlling, and real-time data management are on a rise. Adoption of advanced control techniques in sectors such as oil and gas, power (transmission and distribution), and water wastewater management is demanding advanced automation techniques and solutions, such as SCADA.

Implementation of SCADA systems in any process can eliminate a large amount of tasks required by the operators, thereby reducing the cost of operation and improving system performance. It also allows users to monitor and control the processes remotely via a computer or via a handheld device such as Smartphone or tablet.

3.2 MARKET DEFINITION

The SCADA market has been systematically analyzed in this report with respect to up to date technologies pertaining to the industry. This report describes the applications and recent trends in the SCADA market. There are certain assumptions included in the report, which are based on the market trend that is needed to be made while formulating the total market. Important driving forces, restraints, and opportunities areas are analyzed and described in the report, which are helpful in identifying the key success factors for the industry. The size of the overall market was derived by forecast techniques based on the top-down and bottom-up approaches, studying the application areas and the practices in various geographic regions.

3.3 GENERATION OF SCADA

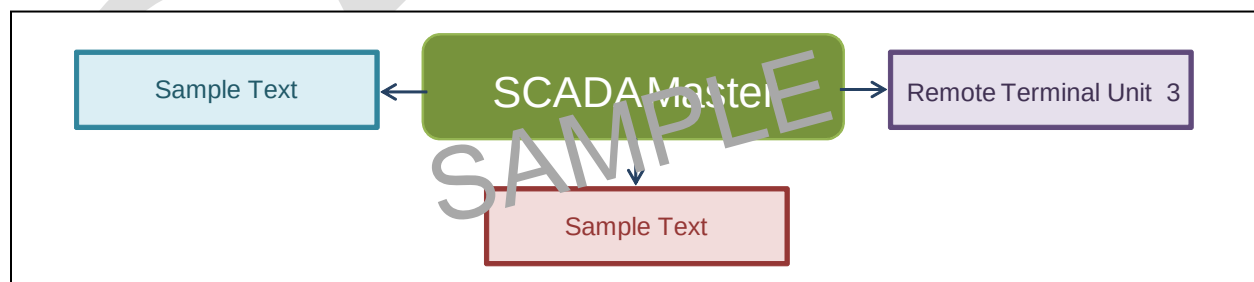
3.3.1 FIRST GENERATION: “MONOLITHIC” SCADA

When the SCADA system was first developed, it was a stand-alone system having no connectivity with the other systems as the network systems were not fully developed and each centralized system stood alone. ‘Mainframe’ was the latest computing concept and SCADA systems were developed in it. Wide area network (WAN), widely used in today’s communication system, was earlier designed with the sole purpose of communicating with the remote terminal unit (RTU) in the field.

SCADA networks had proprietary communication protocols back then. Performing alarming, logging functions, calculating hourly and daily system, accounting functions, and scanning and controlling points within the remote device were the only functions supported by the lean communication protocols developed for SCADA networks. For a redundant SCADA system, a back-up mainframe system was installed and connected at the bus level. On the failure of the primary main-frame system, the back-up system took control completely. Very limited number of connections was available with the SCADA master.

FIGURE 2

MONOLITHIC SCADA



Source: MarketsandMarkets Analysis and EngineersGarage

As shown in the above figure, in the first generation of the SCADA system, each system was a standalone. The WAN technology was used to communicate with the remote terminal unit

(RTU). In monolithic SCADA system, restricted number of systems was connected to the SCADA master with the help of WAN protocol.

3.3.2 SECOND GENERATION: “DISTRIBUTED” SCADA

In second generation systems, with the introduction of local area network (LAN) technology and advancements in the network system, it became possible to distribute the processing to multiple systems. Local area network (LAN) technology was used to connect the multiple systems (that is, mini-computers) and share information in real time.

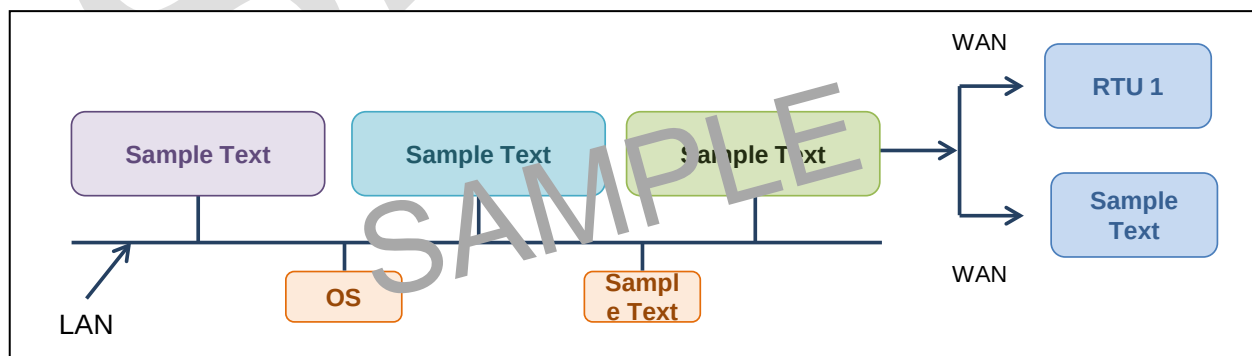
The distributed stations served as:

- Communication processor to communicate with the RTUs
- Interfaces, providing human- machine interface for the system operators
- Database servers

The systems worked within the limits of local environment as the LAN protocols were used to establish the network between the systems. The processing power of the systems increased with the use of distributed SCADA system. The LAN protocols were also proprietary. By optimizing the LAN protocol for live traffic, the network connections from different vendors to the SCADA LAN became limited.

FIGURE 3

DISTRIBUTED SCADA



Source: MarketsandMarkets Analysis and IEEE

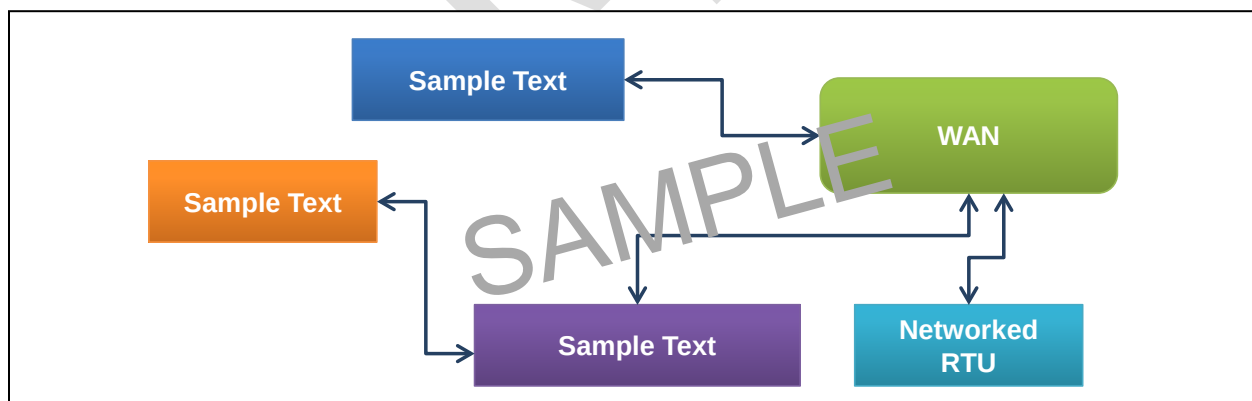
As shown in the above figure, in the distributed SCADA system, the communication and multiple stations are connected in a network with the help of LAN technology. The communication server communicates with field devices and RTUs with the help of wide area network (WAN) technology. The use of both LAN and WAN protocols has enhanced the processing power and has improved the redundancy of the system.

3.3.3 THIRD GENERATION: “NETWORKED” SCADA

The third generation SCADA systems came with change of open system architecture, open standards, and non-proprietary protocols. It made possible to cater to the functionality of SCADA across the wide area network. Open standard and protocols made it simple for the users to connect peripheral devices (that is, printers, monitor, hard disks, and others.) to the system and to the network. With the onset of development using the open system architecture, the vendors moved out of hardware business and started developing SCADA software, which added specific values to the systems.

FIGURE 4

NETWORK SCADA



Source: MarketsandMarkets Analysis and EEP

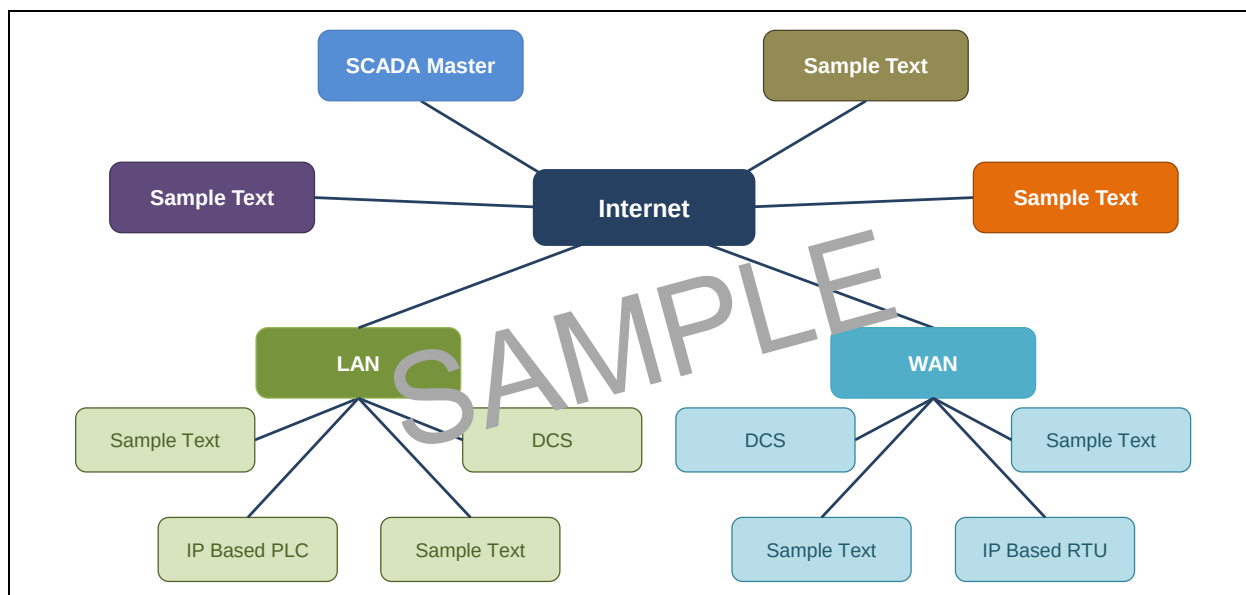
The third generation of SCADA system made use of wide area network (WAN) protocols (such as Internet protocol) to communicate between the SCADA master and other devices. With the advancement of technology, the remote terminal unit was connected via Ethernet to the SCADA master.

Using WAN over the LAN technology gives the advantage of disaster survivability. In second generation systems, distributing the process over the LAN technology improved reliability, but on one system failure, the entire system stops operating. However, on the use of WAN technology in the third generation systems, the processes were distributed in the separate locations so that the SCADA system bears the loss of only one system at that location.

3.3.4 FOURTH GENERATION: INTERNET OF THINGS

The Internet of Things (IOT) is a scenario in which objects are provided with unique identifiers and the ability to automatically transfer data over a cloud without having man-to-man or man-to-computer interaction. IOT has evolved from the convergence of high-end technologies and Internet.

The availability of cloud computing has made it possible for the SCADA systems to report in real-time and use the cloud environment to implement complex algorithms used in the programmable logic controllers (PLC). The Internet of Things is partially associated with M2M communication in the oil and gas, power, and manufacturing industries. The Internet of Things SCADA systems is an IP based SCADA system. With IP based communications, packets are routed to the PLCs or RTUs from anywhere, which no longer require physical access to analog circuits. The PLCs and RTUs, with the help of LAN and WAN technology, connect to the SCADA master via Internet.

FIGURE 5**INTERNET OF THINGS**

Source: MarketsandMarkets Analysis and Cisco

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