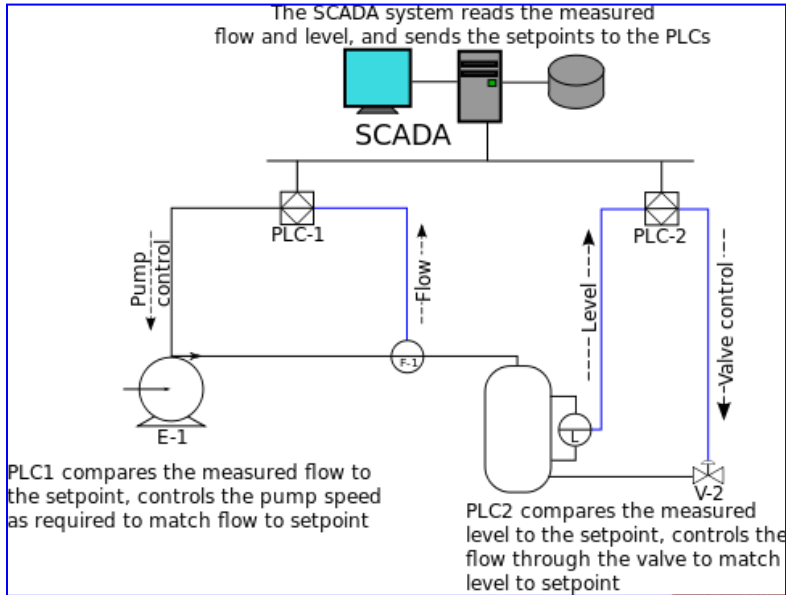


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SCADA – Supervisory control and data acquisition

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SCADA (supervisory control and data acquisition) is a kind of software application program used for the process of control and gather real time from remote locations for exercising this control on equipment and conditions [1].



SCADA is based on PCs computerized system and is a way to monitor and control the equipment which simplifies detection of faults and can be used as a control mechanism.

Fig.1 (left). Schematic overview of SCADA [2].

SCADA solves such critical problems as a real-time monitoring, assessment of various parameters, control of devices, protection of the system from faults, and transmission the data from

external instruments and control devices to PCs located in control unit.

Fig.2 (right). The ways of data transmission.

SCADA finds use in power plants, oil and gas refining, transportation, telecommunication, various treatment plants, in control of waste and water.



SCADA can be used in many different applications and facilities such as:

- 1) HMI – A human –machine interface which represents information about the technological process to a human operator, while the human operator controls it.
- 2) Networks – a set of PC’s connected to each other with server and various controlled devices.

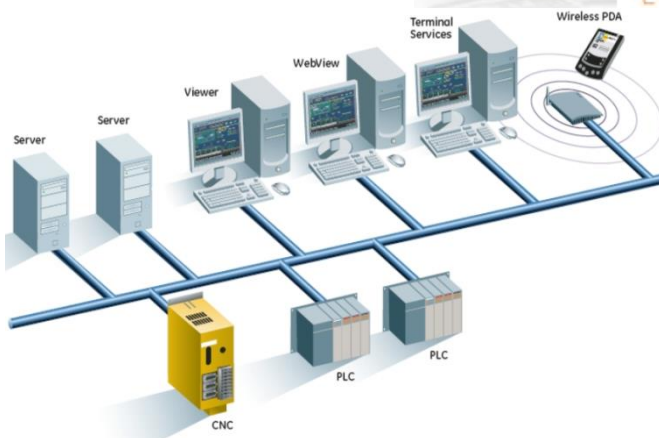


Fig.3 (left). Network.

- 3) Controllers, that interfaces with peripheral devices.
- 4) Databases where information collected.

SCADA forms the heart of power systems supervision and remote control systems. SCADA is a significantly important and progressive used in national infrastructures way to develop automatic of power stations and substations. However, SCADA systems may have security vulnerabilities, so the systems must identify risks and make the solutions to fetch down those risks.

References:

1. <http://www.scadaworld.net/>.
2. <http://en.wikipedia.org/wiki/SCADA>.
3. <http://scada.com/>.
4. <http://www.masterscada.ru/>.
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Types of Substations Differences in Equipment and Functions

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Introduction

A substation is a part of an electrical generation, transmission, and distribution system. Substations transform voltage from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels.

Substations may be owned and operated by an electrical utility, or may be owned by a large industrial or commercial customer. Generally substations are unattended, relying on SCADA for remote supervision and control.

A substation may include transformers to change voltage levels between high transmission voltages and lower distribution voltages, or at the interconnection of two different transmission voltages. The word substation comes from the days before the distribution system became a grid. As central generation stations became larger, smaller generating plants were converted to distribution stations, receiving their energy supply from a larger plant instead of using their own generators. The first substations were connected to only one power station, where the generators were housed, and were subsidiaries of that power station.

Elements of a substation

Substations generally have switching, protection and control equipment, and transformers. In a large substation, circuit breakers are used to interrupt any short circuits or overload currents that may occur on the network. Smaller distribution stations may use recloser circuit breakers or fuses for protection of distribution circuits. Substations themselves do not usually have generators, although a power plant may have a substation nearby. Other devices such as capacitors and voltage regulators may also be located at a substation.

Substations may be on the surface in fenced enclosures, underground, or located in special-purpose buildings. High-rise buildings may have several indoor substations. Indoor substations are usually found in urban areas to reduce the noise from the transformers, for reasons of appearance, or to protect switchgear from extreme climate or pollution conditions.