Security Camera Network, Privacy Protection and Community Safety

PEA organization image and homeland security using CCTV

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Abstract

This paper presents the use of information technology and power line poles in the organization known as Provincial Electricity Authority (PEA), where there are two different applications are described. Firstly, the multi-channel communication (MCC) using both wire and wireless communication media for PEA organization image development is discussed. Secondly, the use of closed circuit television (CCTV) that they can be installed into the street lamps on the power line poles throughout the nation for homeland security is proposed and discussed in details.

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1. Introduction

The Provincial Electricity Authority (PEA), Thailand is a government enterprise under the Ministry of Interior. Its task is to declare policies, to determine organizational plans, and to provide advices, and equipments to subdivisions located in the provinces. The service area of PEA is approximately 510,000 Km\textsuperscript{2}, accounting for 99 percents of the country. There are 73 provinces in the service area, and 910 sub-offices spread throughout the country, delivering services to their customers. Due to the huge coverage area then there are some internal and external communication problems required to solve. Security has been interesting subject and widely discussed in many areas, for instance, in homeland security (Relyea, 2002). Hence, the use of PEA electrical posts can also be used that can be spread over the large area with cost efficiency. Therefore, in this paper, we first present the opportunities and challenges of hybrid network architecture are discussed for electric system automation. More specifically, internet based virtual private networks, power line communications, satellite communications and wireless communications are described in detail. The motivation of this paper is to provide a better understanding of the hybrid network architecture that can provide heater ungenerous electric system automation application requirements. In this regard, our aim is to present a structured framework for electric utilities who plan to utilize new communication technologies for automation and hence, to make the decision making process more actives and direct (Gungor et al., 2006). Since PEA already has many applications those could be served the customer requirements and to help for internal communication, it would be more useful tools if we could link it together and

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utilize it. Detail of the applications and communication media are as follows. Secondly, we present the use of CCTV incorporating in the PEA electrical network for homeland security applications.

2. Multi channel communication

Multi channel communication (MCC) is the gateway to link and be able to support two ways communications. The MCC system is as shown in Figure 1, which is a well equipped system, where the all information from the different sources, for instance, CCTV, PABX, IT Network, Call Center, Router, GIS, AMR, Fiber Optic Network and SCADA can be linked and used via the same MCC. With the security and authorization, the users are define in many access level, for example: customer might be able to view data and pay bill but not be able to edit or delete any data PEA officers, can view data can edits some part that in his responsibility and regional supervisor can view and edit data in his territory. For the applications that will be linked to the MCC, for instance, the automatic meter reading (AMR) technology that uses to provide value added services to their customers. Most AMR deployments involve mobile AMR technology, where the meter reader uses handheld computers to communicate with the meter from a short distance. Drive by solution is also popular one, where the meter reading computer is installed in a van and the meter reader does not have to walk (Ghajar et al., 2006).

Figure 1 shows the communication system via MCC, where CCTV: Closed-circuit Television, SCADA: Supervisory Control and Data Acquisition, PABX: Private Automatic Branch Exchange, AMR: Automatic Meter Reading, GIS: Geographic Information System, SAP: Systems, Applications and Products.

The benefit of a mobile AMR for the electricity customers is that the automatic meter reading which is used for big customer who consumes power more than 100 KVA. Data on meters are read via general position radio system (GPRS) and saved in database for two years. Both PEA officers and customers can view billing data and load profile via internet, where only PEA offices can see alarm data in case of meters error and tamper. Nowadays not only PEA and customers use these data the national electricity regulator also can use these data for demand forecast. In future, if we could install the CCTV in the meters panel then we can see the face of the PEA officers that open the meters panel and also the theft who tamper meter/electricity. Human system is used to keep personnel data of all staffs like resume, salary, job description, time attendance, available training course, jobs vacancy, leave, expenditures etc. individual staffs can view their own information and common information. Supervisor can view his subordinates’
information and can edit some data. Billing system, customer can view bill of this month, historical data, and pay bill. This can be via internet-banking and kiosk. The banner or other information for public relation shall be post and easy to be view by the customers. Systems, applications and products (SAP) will be used for internal only. The following modules have been implements and will increase the internal communication as most of data can be access only to the right users. And also make a good image of PEA: Sales and Distribution(SD), Materials Management(MM), Financial Accounting(FA), Controlling Organization(CO). PEA already set up the call center to support customer all 24 hours. To analyze adoption of 3G services by customers (Pagani and Charles, 2008), the articles maps the dynamics of (1) network investment and user population, (2) entry of service innovators as well as price competitors, (3) the effects of positive network externalities arising from a larger user population, (4) price compression as lower willingness-to-pay users adopt 3G services, (5) scale economies in terminal costs and prices, and (6) new content development as a draw to new users. Applying inductive systems diagrams hypotheses are integrated into a causal loop map and tested with data collected at 15 communications-industry workshops attended by 190 participants in Europe. The map aims to deepen the understanding of the possible evolutionary paths of the 3G wireless value network.

This paper will introduce idea of PE AIS: Provincial Electricity Authority info Service which will be used for both Internal and External communication. Where the internal communication: (1) human system is used to keep personnel data of all staffs as describe earlier, (2) send application to the head quarter, (3) view customers data under his responsibility, (4) view related technical information, (5) view PEA information, (6) view PEA television program, and (7) view PEA magazine and print, where the data security /access will be user name/password and scan photo or retina. The external communication: (1) view bill, historical data, customer data, (2) pay point, (3) view PEA information and public relation, (4) PEA television program, (5) complain and advise. The data security access will be: customer code which can scan the barcode on the bill, identification number and scan retina. It is well known that organizations are becoming increasingly thirsty for data. Having details on the performance of individuals, the company and market factor has long been a necessity in the high tech and finance sectors. Now, manufacturing organizations running large process control networks are finding themselves in the same position (Storey, 2009).

3. Homeland security proposal

In operation, the CCTV will be installed and linked to the regional office, where customer could complain by recording media which will be convenience. In future, the communication will be ways and interactive which will improve the customers service level and customer confidence. In Organization for Economic Co-operation and Development (OECD) countries, watching television is by far the most time-consuming form of leisure. Surprisingly, television viewing is positively correlated with work hours across countries. A simple model based on the notion of aggregate strategic complementarities in social such a pattern as the result of multiple equilibrium, is developed. Workers and capitalists are shown to exhibit opposite preference orderings over equilibrium.

In applications, we propose the use of the installed cameras into the street lamps over the power line poles as shown in Figure 2, which can be implemented throughout the nation with cost efficiency.

- If cameras are installed at the time of power line maintenance, then the cost of attaching it to power line poles will be minimized.
- If cameras are produced in large number, such as 10,000 or more, then the cost of each cameras will be less than 200 US$/piece (NPO, 2009 and Fujii et al., 2009).
- PEA-cooperates with police department and install huge number of cheap cameras with memories are embedded to the street lamp throughout the nation.
- Images are coded using selected code.
- PEA cannot view (open) the images (NPO, 2009)
- Police can open the image (de-coded)
- PEA gives the images to police only when crime is occurred.
As for the very important sites (places), where real time watches is necessary, network cameras are suitable (NPO, 2009 and Fujii et al., 2005).

![Diagram of CCTV cameras installation on power line poles.](image)

Figure 2 shows the installation CCTV cameras into street lamp on the power line poles.

### 4. Discussion and Conclusion

Network-based organizations are the main components of the information and knowledge society. The market competition force networked organizations in the direction of continuous change to be able to follow the change of market demands. The communication via fiber optic to support services targeted at the full cover, but inside the unit, PEA itself has not yet fully utilize their fiber optic communication network, so far only the organization communications are the current focus on network communication systems to support the work which is controlled by the main agencies and the electrical distribution system command automatically. Moreover, information technology systems will help to increase efficiency in electricity service and management of the organization to meet the needs of customers, which is a key issue for direct releasing. Innovation multimedia communication via fiber optic system for releasing in progress to combined with technology. Demand is increasing, whether in the form of the voice and the data or even television programming. The PEA will be benefit to this system throughout the region, better in internal communication and better service to the customer would lead to good image of PEA. For future plan, PEA has desired to use the power line poles for street lamps and camera installation being used for homeland security. The concept is that the use of low cost computer for security via internet, which will be available for e-JIKEI system.

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