

**VOLTAGE RECOVERY AND CONTROL METHODS FOR LINUX SYSTEM ADMINISTRATORS AND PROGRAMMERS**

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**ABSTRACT**

Voltage can be expressed quantitatively as the potential difference in charge between two electrical field points. Due to high penetration of distributed generation in today’s power distribution systems, maintain acceptable voltage level has become a major challenge for Linux professionals. The challenge of maintaining this acceptable voltage level has created a gap that researchers investigated on. The researcher concentrated on the centralized and decentralized methods of mitigating voltage issue within the power distribution of Linux system administrators and programmers. This research was carried out in 15 Linux professionals within USA. Data collection method used was the administration of questionnaire online by the researcher and by the use of secondary data for various sources such as website. Therefore, this paper presents method for Voltage recovery and control methods in distribution of power of Linux professionals.

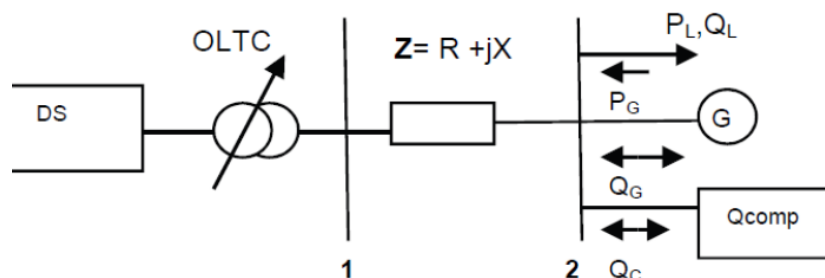
**KEYWORDS:** distribution generators, Linux professional

**INTRODUCTION**

The design for most convection distribution networks are based on unidirectional power flow. Thus, distributed generations connection in Linux professional has posed a challenge to Linux system administrators and programmers in changing their operation approach from passive to active network system (Jenkins et al., 2000). The increased connection of distributed generators within the systems of Linux professional has become more dynamic with a bi-directional power flow. Linux system administrators and programmers have adopted an integrated control and communication technologies that can manage and accommodate the new active network (D’Adamo et al., 2009). The Active network distribution provides an increased operational reliability in power delivery. Some of weaknesses of the active networks are folded in maintenance issue such as inexperience, and poor communication networks. The major challenges addressed in the implementation of power distribution in Linux professionals by use of distributed generations are the levels of voltage and flow of power.

Because of increased number of distributed generations’ penetration, voltage level has become an important issue in distribution systems. The increase has forces voltage to rise beyond the permissible levels (Pilo et al., 2009). The voltage rise effect due to the connection of a distributed generator in a simple circuit is illustrated below.

In this simple system, the generator, G with generation  $P_G$ ,  $Q_G$  together with local load,  $P_L$ ,  $Q_L$  and a reactive compensator,  $Q_C$  is connected by a weak rural overhead line to the distribution system.



**Figure 1: A simple circuit showing the connection of distributed generations in a active network for Linux professional.**

Voltage can be calculated approximately using the formula below

$$V_2 = V_1 + R(PG + PL) + X(QG + QL + QC)$$

$$V_2 = V_1 + R(PG + PL) + (QG + QL + QC) X$$

This equation analyzes the qualitative relationship between the bus bar voltage and the generation amount connected.

Voltage controls methods with distributed generation

The main aim of regulating voltage in distribution system is to keep the steady voltage state in an acceptable range. The main voltage controls equipment's in used are on-load tap-charger transformers, switched shunt capacitor and step voltage regulator. Operations of the above equipment are on the basis of an assumption that flow of power is unidirectional and the voltage decreases in line with the feeder from substation to remote end (Borbely and Kreider, 2001). On-load tap-charger (OLTC) has tap that automatically adjust. Shunt capacitors are used to generate power that is reactive that compensate its demand and hence voltage boost is attained. The above voltage control mechanisms are centralized implying that a wide communication range in the systems is needed in coordinating device in use.

In addition some organization has been using decentralized voltage recovery and control methods such as multi agent and simulated annealing controls (Sansawatt T., 2010). These methods use local information to control voltage independently at a particular bus with limited optimization and communication. Decentralized control has a major advantage of providing voltage support by controlling locally operation modes. The approach is capable of performing without the need of large investment in communication thus cost saving.

Due to the problem of power fault, over voltage or under voltage various research paper have been do with the aim of finding out how these problems can be solved (Hidalgo et al., 2010). This is illustrated in the diagram below in the flow chart below:

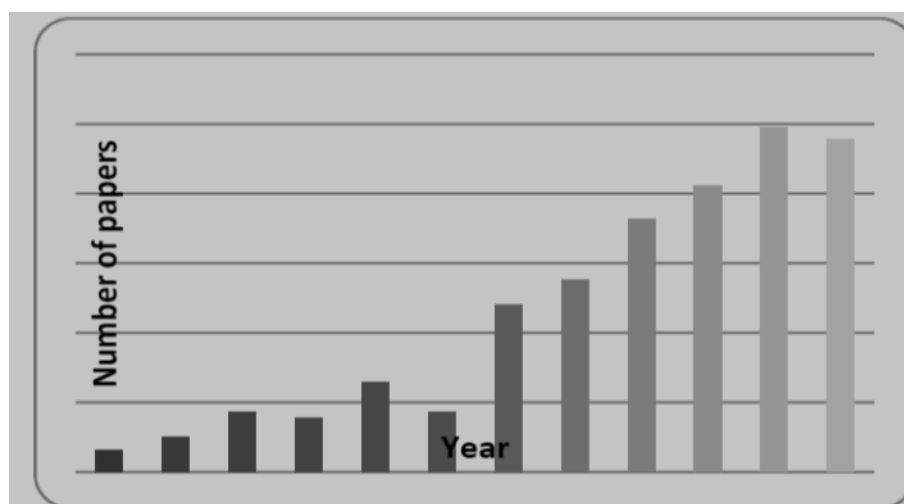


Figure 2: number of papers published between 2000 and 2011 on the voltage control and recovery.

## MATERIALS AND METHODS

Major material for this research was the websites and the past research carried out a by other researcher. the topic of voltage recovery and control methods in networks seem not to be fully researcher on thus more research publication need to be done to allow. The other source of material was the publication of various Linux professional who formed the population of study.

Even though secondary materials were used the researcher majored on quantitative survey method. A questionnaire with both closed and open ended question was developed to guide this study and the data analyzed by use of tables and graphs (Wilkinson and Task Force on Statistical Inference, 1999). These questionnaires were administered online to the organizations since the researcher was able to obtain their emails and website on line. The information provided was treated with secrecy and confidentially. Importantly, this method helped reflect the cause-effect relationship which enabled the researcher made an informed decision. The researcher selected this method since low cost was involved (Wilkinson and Task Force on Statistical Inference, 1999). This method was not only relevant to the researcher but the respondent as well makes it easier information.

## RESULTS AND DISCUSSION

The result of this research is summarized in the table below as they were easy to understand and analyze (Wilkinson and Task Force on Statistical Inference, 1999).

**Table 1: Response rate**

Questionnaire emailed	Questionnaires replied %	No reply %
15	12 (80%)	3(20%)

From Table 1 above 12 out of 15 responded to the question representing 80%. Only 3 (20%) failed to respond. Despite the fact that the research was conducted within a short time the respondent was excellent.

**Table 2: Organization using voltage recovery and control method**

using decentralized voltage control %	Centralized voltage recovery and control %
9 (75%)	3 (25%)

From table 2 above 9 out of the total number of 12 indicated that they used decentralized voltage and control method. The main reason was that most Linux professional required less coordination and communication and are small size thus needed a cost effective organization. The rest 3 has adopted centralized voltage controls to cater for power and energy disruption. Most of the professional are in use of more sophisticated software and systems that required a non-disrupted supply of energy.

## CONCLUSION

This research found that decentralized method was the most preferred voltage control and recovery approach by most of the organizations under the study due to; no coordination/limited communication, low cost in administrating it thus cost saving and can be controlled locally. Comparably centralized methods require wide coordination/communication, high cost and extensive control. In additional, further research need to be done on how improved voltage recovery and control method need to be improved to ensure standard in operation by various organizations.

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