

**ENERGY THEFT DETECTION IN MULTI-TENANT
DATA CENTERS WITH DIGITAL PROTECTIVE
RELAY DEPLOYMENT**

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ABSTRACT

- Among data centers with different operational structures, multi-tenant data centers (MTDCs) are increasingly popular among various internet service providers for the ease of deployment. Despite the offered benefits, MTDCs are vulnerable to various cyber attacks.
- we propose an anomaly rate range based dynamic programming algorithm for inserting DPRs into the data center while minimizing the deployment cost.
- Our algorithm optimizes the DPR deployment through exploring an innovative aggregated anomaly rate range which accounts for the long term effect of energy theft in an MTDC.
- In addition, given the historical records of energy usage for all tenants, we calculate the anomaly rate range for each tenant, leveraging the
- Minimum Covariance Determinant (MCD) based anomaly identification algorithm.



EXISTING SYSTEM

- High performance data centers serve as the backbone of the prevailing cloud computing paradigm.
- Among data centers with different operational structures, multi-tenant data centers (MTDCs) are increasingly popular among various internet service providers for the ease of deployment. Despite the offered benefits, MTDCs are vulnerable to various cyber attacks.
- An important Cyber attack is energy theft which can be launched by malicious tenants to reduce monetary cost of the electricity consumption.
- It can be achieved through attacking a smart meter in the data center to undercount its energy usage.
- By alleviating the financial burden of the cloud service providers in MTDCs, energy theft discourages frugality in terms of energy consumption, which is highly undesirable in the era of sustainable computing.
- Despite fruitful research results on MTDCs, none of them address energy theft.



DISADVANTAGES

- leads to huge electricity bills
- Energy consumption

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PROPOSED SYSTEM

- we propose an anomaly rate range based dynamic programming algorithm for inserting DPRs into the data center while minimizing the deployment cost.
- Our algorithm optimizes the DPR deployment through exploring an innovative aggregated anomaly rate range which accounts for the long term effect of energy theft in an MTDC.
- In addition, given the historical records of energy usage for all tenants, we calculate the anomaly rate range for each tenant, leveraging the Minimum Covariance Determinant (MCD) based anomaly identification algorithm.
- To the best of our knowledge, this is the first work addressing the energy theft issue in multi-tenant data centers.



ADVANTAGES

- Electricity consumption
- limit the number of smart meters
- effect of energy

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HARDWARE REQUIREMENTS

- Processor - Intel
- Speed - 1.1 GHz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Monitor - SVGA

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SOFTWARE REQUIREMENTS

- Operating System - Windows 7/8
- Front - End - ASP.NET with C#
- Tools used - Visual studio 2010
- Back – End - SQL SERVER 2005

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REFERENCES

- Data Center Knowledge. (2014) Four big advantages of multi-tenant data centers. [Online]. Available: <http://www.datacenterknowledge.com/archives/2014/08/07/four-big-advantages-multi-tenant-data-centers/>
- M. A. Islam, H. Mahmud, S. Ren, and X. Wang, “Paying to save: Reducing cost of colocation data center via rewards,” in Proceedings of 2015 IEEE 21st International Symposium on High Performance Computer Architecture (HPCA), Feb 2015, pp. 235–245.
- M. A. Islam, X. Ren, S. Ren, A. Wierman, and X. Wang, “A market approach for handling power emergencies in multi-tenant data center,” in Proceedings of 2016 IEEE International Symposium on High-performance Computer Architecture (HPCA), 2016.

