

ENERGY CONSUMPTION IN FAILURE OF BUSINESS PROCESS SERVICES

WARTIKA¹, HUSNI SASTRAMIHARDJA², KRIDANTO SURENDRO³, IPING
SUPRIANA S.⁴

¹²³⁴ School of Electrical Engineering and Informatics, Bandung Institute of Technology

E- Mail : ¹wartika31@yahoo.co.id, ²husni@informatika.org, ³endro@informatika.org, ⁴

E-mail: iping@informatika@org

ABSTRACT

Business process is integral part of modern organization. Linkages and interaction between resources and business process can have significant effect on use of energy. Because policies of environmental regulations, then organization needs to know and evaluate the performance of services business process so that can minimize energy consumption. This service can cause failure. This failure can increase intensity of resources utilization. This paper is used design study case result, method of research are experiment and interview. By knowing the growth of energy consumption in failure business process service, organization can minimize impact on environment by doing recovery process on the failure

Keywords:- *Service, Business Process, Failure, Energy, Consumption*

1. INTRODUCTION

Concerns environmental impact as a result of increasing human activities and some efforts have been initiated globally to reduce energy consumption and increase energy efficiency. Recently, [11] have proposed some general approach to energy management. [3] emphasize the importance of reducing energy consumption. In order to increase potential of information systems for organization of “green”. Not only technology, but process need to be calculated. Implementation of process will consume energy and energy related to process. But, difficult to know what the real environmental impact of implementation process. [4][8] in this research reveale that linkage and interaction between process and business can have significant impact to energy utilization.

Organization need to know and evaluate performance of business process services, in order that can reduce energy consumption. In practice, this business process service can fail. The failure in service is condition that did not meet the desired goal. A true service is delivered when the services implements the fuction of process. This failure will increase intensity the use of resources. In order that, organization need to know how the growth of energy consumption in the failure of business process services, so that can reduce impact to environment and optimize the use of resources.

2. RESEARCH DESIGN CASE STUDY

Given the goal handle how the case study design was chosen for this study [2]. Case study is a methodology that is recognized and used widely in information systems research [8]. It is suitable for the exploration of new topic areas that do not have empirical validation Case study can explain the phenomenon, testing teoriatau develop new theories and hypotheses [2][6].

Given the goal which is handle how the case study is choosed to this research [1][2]. Research of study case is a methodology that is recognized and used widely in the system information [5]. It is suitable to explore new topic area which have not empiric validation [6]. Research of study case can explain phenomena, teory testing or new teory development and hypothesis [2][6].

[5] Analyze 1.691 article from leading journal of information system and found that research of study case implement in 25% from all article. Study Case research have advantages that data from other sources can be combined

[5] very useful to information system strategy of research which is related to perception of managerial, roles and patterns of complex

interaction from management of information system [2][6].

This applies to a particular situation and appropriate with recently condition and appropriate with research which is done is to explain the pattern of energy consumption growth in the business process service failure.

Special study design based on several case studies between January 2013 to December 2014, experiments and interviews conducted on 25 companies which have the characteristics of service business processes that are relatively the same. Approach of explorative study case which is use in this research refer to the frame of research.

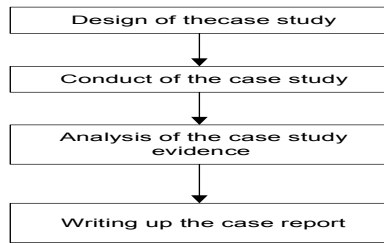


Figure 1 : Research Design Case Study

Table 1 : Organization Characteristics Which Is Analyze

Total of business process	6 – 10 process
Total of business process service	12-25 services
Volume of service	20-85 /day
Total employee	54– 2038 employee

3. THE FAILURE OF BUSINESS PROCESS BUSSINESS

The failure of service is condition which not fulfill the fulfill the desired goal. A true service delivered when the service implement process function. And the failure of service which is often shortened failure is a occurrence which is happened when the service delivered diverge from true service. In the nut shell, failure is process which is not fulfill the desired goal. Failure usually seen as the opposite of truth.

Failure is chatter state from true condition. In the domain of business management, there is exclusion other terms that also be defined as the chatter state of desired secuencia event. Failure concept and the exclusion are treated differently in

the research [10]. Basically, the exception is a deviation from the sequence of activities in the process, and failure refers to the deviation of the state of activity. Exceptions always been problems which are associated with the structural model of the business process, but failure is run-time behavior of a process.

Base on literature [9] , about metric green in service context (service), one of the performance that can be measured is the process time (process time) from the service. Service processing time is the average time that is taken from service of time of the request until the time of completion, include delay.

In the process, failure may happened in every condition because the reason which is related with this event, problem which is related to resource or human error.

Regardless of the source of failure, [11] found that failures can be included in one of the following categories Potential failure:

- a) Incomplete, the activity is not fully perform of this fuction.
- b) Invalid, the service does not run at the right time or do not produce the desired results
- c) Inconsistent, the perform of activity is not consistent.
- d) Inaccurate, the action does not run according to proper destination

Chatter state from the true service can assumed as a different form which is modus the failure of service and ussualy called failure service depend on failure severity [11] . defined the failure severity as as the magnitude of the losses suffered due to the failure:

- 1 = Failure is not considered or do not affect the process
- 2 = Failure of little consequence so it is not apparent
- 3 = The failure resulted in a minor annoyance but does not result in performance
- 4 = Failure to result in a slight loss in performance
- 5 = Failure affect the process in order that giving rise to the complaint
- 6 = Failure cause partial damage to the process
- 7 = Failure to generate significant user dissatisfaction

4. DISCUSSION

First step to know energy consumption in the failure of business process failure is identify the service, as follow:

- a) Establish business domain
- b) From this business domain, then to be detailed business process, tool which is use an example BPMN (Business Process Model and Notification)
- c) Then, identify the service from sub process

This is can do with adoption the research of [8] about the abstract functionality layer SOA (Service Oriented Architecture). Second step is identify failure. In the definition of failure need to know characteristic of service, potential failure, dan severity of failure. Third step is measure consumption of energy in tha failure service.

This steps can describe as follow:

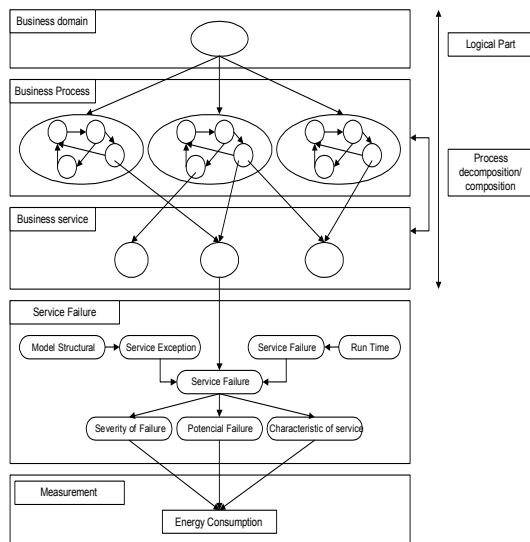


Figure 2 : Model Identification Of Services Failures

To see the increase in energy consumption in the failure of the business process services necessary to measure, in this study using experimental measurements. Experiment is a regular procedure, which is carried out with the purpose of verification, deny, or prove the validity of the hypothesis. Experiments provide insight into causation by showing what happens when the result of certain factors manipulated. Experiment vary widely in purpose and scale,

but always rely on repetitive procedures and logical analysis of the results.

The following flowchart described measurement process

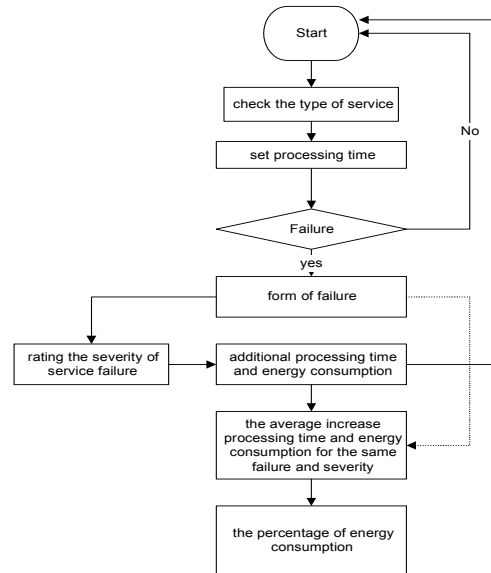


Figure 3 : Flowchart Of Process Measurement Energy Consumption

Experiment which is conduct as follow:

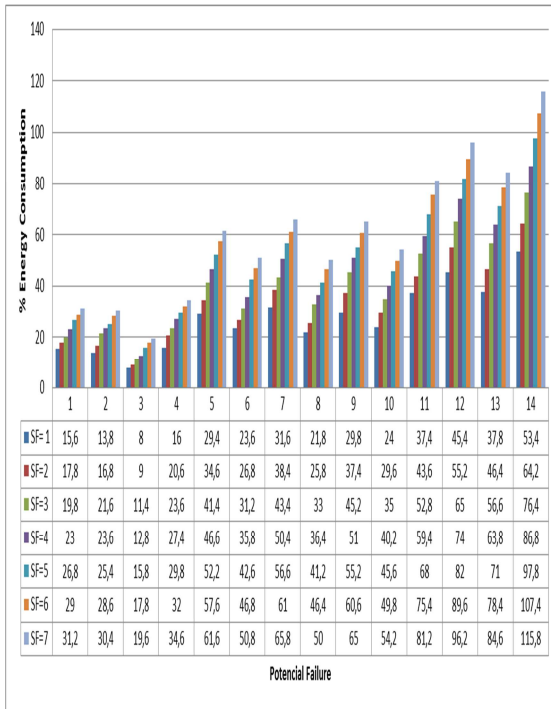
- Type of experiment = Controlled experimet
- Method to determine the impact = Dose response analysis
- Characteristics of service = Seamless aggregation
- Type of computer = Desktop
- 1 hour ofcomput = 75 Watt

Table 2 : Potential Of Failure

No	Potential of failure			
	Incomplete	Invalid	Inconsistent	Inaccurate
1	√			
2		√		
3			√	
4				√
5	√	√		
6	√		√	
7	√			√
8		√	√	
9		√		√
10			√	√
11	√	√	√	

No	Potential of failure			
	Incomplete	Invalid	Inconsistent	Inaccurate
12	√	√		√
13		√	√	√
14	√	√	√	√

This is graphic of energy consumption (%) base on potential failure:



Information :
SF = Severity of failure

Figure 4 : Grafic Of Energy Consumption Base On Potential Failure (%)

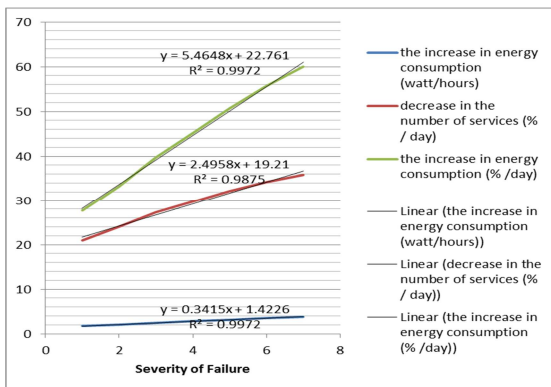


Figure 5 : Grafic Of Energy Consumption Base On Severity Of Failure

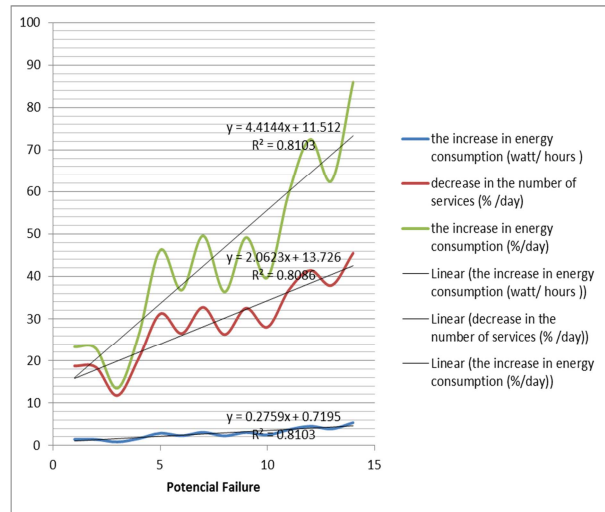


Figure 6 : Energy Consumption Function Base On Potential Failure

5. CONCLUSION

From this experiment and interview which is conducted in this research about energy consumption in failure of business process services , in order that can be concluded as follow : increasing energy consumption average 2,78 watt per hours, decrease in the number of services average 29,19 % per day, and the increase in energy consumption average 44,62 % per day

6. FUTURE RESEARCH

From this research of energy consumption in the failure of business process service, furthermore need to be done research of how recovery process which is done, in order that this growth can be minimize.

ACKNOWLEDMENT

The authors would like to thank for Eddy Suryanto Soegoto , Ummi Narimawati, Dadang Munandar , Indonesian Computer University, Indonesia for support and research facilities .



REFERENCES:

- [1] Bansal, P. (2005) Evolving Sustainability: A Longitudinal Study Of Corporate Sustainability Development, *Strategic Management Journal*, 26, 3, 197–218.
- [2] Benbasat, I., Goldstein, D. K. And Mead, M. 1987. "The Case Research Strategy In Studies Of Information Systems," *MIS Quarterly* (11:3), Pp. 369–386
- [3] B Pernici, D Ardagna, C Cappiello , Business process design: Towards service-based green information systems, - E-Government Ict Professionalism, 2008 - Springer
- [4] Broadbent, M. and Weill, P. (1997) Management by Maxim: How Business and IT Managers Can Create IT Infrastructures, *Sloan Management Review*, 38, 3, 77–92.
- [5] Dubé, L. And Paré, G. 2003. "Rigor In Information Systems Positivist Case Research: Current Practices, Trends, And Recommendations," *MIS Quarterly* (27:4), Pp. 597–635.
- [6] Eisenhardt, K. M. 1989. "Building Theories From Case Study Research," *Academy Of Management Review* (14:4), Pp. 532-550.
- [7] Konstantin Hoesch-Klohe, Aditya Ghose, Lam-Son L[^]e, Towards Green Business Process Management, University Of Wollongong, Wollongong NSW 2522, Australia School Of Computer Science And Software Engineering Decision Systems Lab
- [8] Michael Papazoglou, Web Services and SOA: Principles and Technology (2nd Edition), Jan 13, 2012
- [9] Paolo Bozzelli, Qing Gu, Patricia Lago, A Systematic Literature Review On Green Software Metrics, 2012
- [10] Xiaocheng Ge, Richard F. Paige, And John A. Mcdermid, Failures Of A Business Process In Enterprise Systems, M.M. Cruz-Cunha Et Al. (Eds.): CENTERIS 2011, Part I, CCIS 219, Pp. 139–146, 2011. © Springer-Verlag Berlin Heidelberg 2011
- [11] Watson, R. T., Boudreau, M. C., & Chen, A. J. (2010). Information Systems And Environmentally Sustainable Development: Energy Informatics And New Directions For The IS Community. *MIS Quarterly*, 34(1)