Research on the Technology for Systems Design of E-Business

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ABSTRACT

The objectives of this paper are to study and investigate recent technologies concerning systems-design for virtual enterprise.

Recently we have global E-XX systems utilizing internet and server/client computers, such as E-Business, E-Commerce, E-Community, E-Learning, E-Government, and so on. Moreover we hear so often Mobile Computing and Ubiquitous Computing.

In this paper, the author pays considerable attention to E-Business, especially systems-design technology of E-Business. Generally we have four steps in systems design those are process of Plan, Do, Check, Action. P/D/C/A steps of this paper are as follows. First step P: We describe systems-design layer that is triple technological layer of application/middle/base. Second step D: The author introduces virtual enterprise that is composed of significant software and an instance of E-Business (B to B). Third step C: The author makes an original proposal that is tradeoff-valuation approach (TVA) between systems and security. Tradeoff means an exchange in which benefit is given up for another considered more desirable. Final step A: We have conclusion and estimated issues. These are to be activated works between in systems-design activity and in a bit future activity.

1. SYSTEMS-DESIGN LAYER

As shown in Table 1, the author asserts that the systems-design of E-Business has three points of view in its technological layer as follows.

1) Application layer such as Design Policy & Planning, Purchase Sys., Inventory Sys., Production Sys., Sales Sys., Receipts & Payment Sys., and Security Sys.
2) Middle layer such as Web Service, XML-Database, and Security Sys.
3) Base layer including the platform of E-Business, Server Operating Sys., and Security Sys.

The author presents submission that we would be able to make concept of systems design of E-Business by utilizing this triple layers. In case of consider systems-design, which direction do you select from top-down or bottom-up in this triple layer?

The answer of this issue depends on as the case may be that application oriented or base layer oriented is selected by needs of various situations of virtual enterprise. We design the systems not that usually from zero-based system but that often as revised-based system.

The author asserts that the most important technology for development of information systems is "Systems Design", and again asserts that the systems design of information application systems has double side of view which

is main object-activity and keeping "SECURITY". Therefore in table 1 SECURITY SYS is bold typed on each three layers.

2. SIGNIFICANT SOFTWARE IN VIRTUAL ENTERPRISE

As shown in table 1, systems-design layer is in virtual enterprise. The author says that virtual enterprise isn't equal to real company. One of the greatest difference between virtual enterprise and real company is that virtual enterprise does not necessarily compose from single company but also often is composed from plural and omplex companies. Each layer has various sort of software-packages related with E-Business. To take a few examples, Layer'!has CRM (Customer Relationship Management), ERP (Enterprise Resource Planning), SCM (Supply Chain Management), and DWH(Data Warehouse). Layer a‡has Web Service software those are SOAP (Simple Object Access Protocol), WSDL (Web Service Description Language), UDDI (Universal Description Discovery Integration), XML-Database, and SQL Database. Layer b‡has server OS, and server-side significant software.

As for security systems in three layers, we have much security software such as Firewall-soft, PKI-soft, VPN-soft, Cipher-soft, Busting Virus-soft, Digital Money soft, and so on. We utilize these software as for encrypting business-document, digital certificates, detecting privacy, tracing hacking-route, seeking business-scam, access control and restriction, securing electronic money, packet filtering, discovering spoof etc.
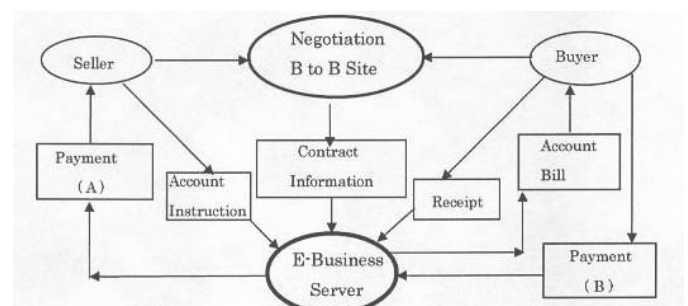
3. AN INSTANCE OF E-BUSINESS (B TO B)

E-Business (B to B) has business-transaction data from business companies to business companies thorough internet communication.

3.1 Security System in Payment Activity

As shown in Fig.1, E-Business server-computer supervises business transaction-data with seller and buyer. Real seller and buyer in this system generally do not meet face to face mutually. The company or enterprise is often virtual, therefore security information for seller and buyer is exceedingly important in these systems.

Figure 1: E-Business (B to B) (Note: E-Business Server has condition with credit, insurance, etc.

Table 1: Systems Design/Layer

			Virtual Enterprise
Application Layer	I	I	Design Planning/ Purchase Sys./ Inventory Sys./ Production Sys. / Sales Sys./ Receipts & Payment Sys./ **SECURITY SYS.**
	II	II	Middle Layer — Web Service/ XML-Database/ **SECURITY SYS.**
	III	III.	Base Layer — Platform/ Server Operating Sys./ **SECURITY SYS.**

Especially payment(B) and receipt are most important in Fig1. We must be exceedingly careful in selecting any sort of electronic and digital moneys those are E-credit, E-check, E-transfer, and any E-money (IC-card, Cyber cash, etc.). These electronic and digital money are recently called high-tech money which involves cellular phone & electronic wallet and other mobile & ubiquitous unit.

We utilize certification system for the purpose of certifying seller and buyer whether he is real being or false being. False being is called as spoof. It is not easy to perceive the truth in business transaction. However we must approach nearly risky situation for the purpose of getting profit. Generally we often hear that business management is challenge to the risk. Risk on the business activity often occurs as the criminal act of money trouble.

Therefore the author suggests that we should prepare the payment systems as much as various sorts of cases. Then we must select the payment system according to the significance of business relationship. Moreover the author says that E-Business has relationship with E-Banks (Finance), E-Commerce (General, Auction, Mail order Sys.), E-Government (Certification Sys.), E-Insurance, E-Community, and so on.

3.2 Dynamic and fresh Contents in E-Business Site-System

The contents of business-transaction site are most important for the success of business negotiations in E-Business system. Popularity of contents in web-site depends on break-through of technology. Technological popularity in present time is as follows. The author says that contents will be realized by combination of these technologies.
a) XML-Database
b) Video-Streaming
c) IP-Multicast
d) Web-3DCG
e) Interactive Communication
f) Mobile & Ubiquitous Computing

Java program, XML-multimedia source data and special program concerned with technologies ((a) ~ (f)) will be able to make dynamic contents of E-Business site systems.

3.3 The age of XML revolution in E-Business

The author asserts that we should meet the age of XML revolution in E-Business which is the next generation E-Business as follows.
1) E-Business systems would change in its style by XML systems.
2) E-Business systems would separate from one system to two or more subsystems.
3) E-Business systems would consist of inner system, middle system and outer system those are backend system, middle system and front-stage system.
4) E-Business systems would have connectivity between web-site and transaction systems those have continuity from portal site to transaction processing systems
5) The general aspect of XML revolution has new generation workflow systems in the next generation IT society.

4. TRADEOFF-VALUATION APPROACH (TVA) IN SYSTEMS DESIGN OF E-BUSINESS

4.1 Conceptual thinking of Tradeoff-Valuation Approach (TVA)

The author guesses that you know relationship between prices and employment in the economical society. If prices would be going up, then employment opportunities have more and more expanded. This relationship is approved in opposite situation. That is to say, if prices would be falling then employment opportunities have less and less become narrow, and as a logical consequence unemployment increases more and more. This relationship is defined as that A and B are in the tradeoff-relationship with each other.

In systems design, we expect much profit that is brought by the result of object-activity which is business transaction or systems model. However profit doesn't come true without security systems.

In this paper, the author suggests the next hypothetical formula in systems design.

$$Profitability = Feasibility + Security$$

Feasibility is expecting result of object-activity in systems design. Object-activity is brought from each system/subsystem in each layer of the table

1 which is exclusive of security systems. That is to say, feasibility is active technology on the other hand security is passive technology.

The author says that we would be able to see tradeoff-relationship between active technology and passive technology. So if we might reject passive technology then we could not realize expecting better result of active technology.

In this paper, the author asserts that we would be able to estimate necessary valuation of each system/subsystem by utilizing tradeoff-relationship as shown in the table2.

Information-systems security is in connection with C/I/A-A/A/R in the table 2. C/I/A-A/A/R are regulated in JIS X 5080, ISO/IEC 17799, BS 7799, ISO/IEC 15408. In this paper, the author would like to discuss relationship between C/I/A-A/A/R and tradeoff-valuation. Then we should be aware of the fact that the Table 2 is in connection with each layer of the Table 1.

Table 2: Tradeoff-Valuation Approach (TVA)

Sys \ Security	Sys/Sub A	Sys/Sub B	Sys/Sub C		Valuation
C/I/A	a / m	b / n	c / o		
A/A/R					
Others					
P					

Notes 1 : C/I/A is regulated as Security Policy.
           C (Confidentiality),I(Integrity),A(Availability)
Notes 2 : A/A/R is regulated as Security Design.
           A(Accountability),A(Authenticity),R(Reliability),
           P(Profitability)
Notes 3 : Estimated numerical value (earnings and costs) is written
           in each box.
           a,b,c,~ = Earning (in Feasibility), m,n,o,~ =
           Loss (in Security)
           Each row has similar meaning in each box.
Notes 4 : Tradeoff-Valuation Approach(TVA) / Masaru Makino,
           All rights reserved.

4.2 Procedure of Tradeoff-Valuation Approach (TVA)

For the purpose of filling Table 2 by value of sys/sub and cost of development for security system, the author asserts that we must have forward procedure as follows.
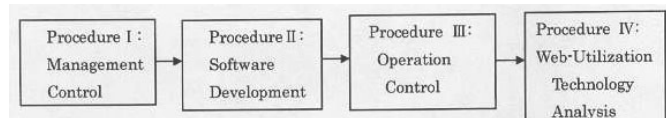
We have 4 steps of these procedures as shown in Fig 2.

Procedure I: This is the procedure concerned with management control. This procedure has sub-procedures, those are sales profit, sales amount, shared cost, cost of advertisement, and so on.

Procedure II: This is the procedure of software development. This procedure has sub-procedures, those are the cost of web application software, security concerned software, and so on.

Procedure III: This is the procedure of system operation control. This procedure has sub-procedures, those are outsourcing cost, organization measures cost, security measures cost, and so on.

Procedure IV: This is the procedure of web concerned technology analysis. This procedure has sub-procedures, those are portal site analysis, top-page hit number, search engine analysis, access log analysis (keyword and access person analysis), web-site analysis (link situation, site

Fig. 2 Procedure of TVA

Procedure I : Management Control	→	Procedure II : Software Development	→	Procedure III: Operation Control	→	Procedure IV: Web-Utilization Technology Analysis

design etc.).

The author asserts that we must use these procedure ('!^ÿc!) for feasibility estimation of system/subsystems, and for security estimation of C/I/A or A/A/R in the Table 2. And moreover we must estimate other items for profit and loss situation.

We should always be aware of balancing for management and technologies those are great importance of trade-off valuation approach (TVA).

5. CONCLUSION

In this paper the author asserts the following conclusion on the technology for systems-design of E-Business. (1) Triple systems-design layer : We have triple layer for systems design of E-Business as shown in Table 1 those are Application, Middle, Base. (2) Virtual-enterprise software : We have significant software in virtual enterprise on each of the triple layer. (3) An instance of E-Business : The author gives typical model those are security system in payment activity and dynamic & fresh contents in E-Business site-system. (4) Tradeoff-valuation Approach : The author presents original Tradeoff-Valuation Approach (TVA) in systems design of E-Business by using the Table 1, Table 2 and the procedure of TVA (Proc.'!^ÿc!).

6. ESTIMATED ISSUES

In this paper, the author has issues that we should take measures to meet the new situation in the short distant future. Information-systems and computer-environment change year by year. Computer and network technology makes progress with tremendous speed. Therefore the author should always have preparation for the next step. For example of issues are (1) Connection and Balancing between E-Business and E-Government especially digital certificates or detecting privacy, (2) Social Security for Business scam, (3) Revolution on Virtual Enterprise, and so on.

REFERENCES

(1) Masaru Makino, " Security Systems Design for MIS/OA related with Computer Network ", Proceedings of 2000 MIS/OA International Conference, KMIS(Korea MIS Society), June 2000, pp.205-208.

(2) Yuusei Ishida, Masaru Makino, " Study on Cyber Information Security ", Memories of Fukui University of Technology (No.32), March 2002, pp.327-334.

(3) Masaru Makino, " Research for the SECURITY systems-design of information application-systems", Memories of Fukui University of Technology (No.31), March 2001, pp.313-319.

(4) Japan IBM Corp., " Developers guide of WebSphere-Application Server ", Pierson Education Corp., May 2001.

(5) Japan IBM Corp., "Approaches to the Next Generation of e-business", ProVISION (No.32), Winter 2002.

(6) IEEE Computer society, " Computer (September 2002) ", IEEE, September 2002.

(7) IEEE Computer society, " Computer (August 2002) ", IEEE, August 2002.

(8) IPSJ, "Revolution of Network Technologies to Support the Ubiquitous Computing Environment ", IPSJ Information Processing Magazine, Vol.43 No.6, June 2002.

(9) IPSJ, "Multi-Cast Technology", IPSJ Information Processing Magazine, Vol.42 No.8, August 2001.

(10) Kureha Odera, Others, "Intelligible ISMS (Information Security Mgt. Sys.)", NikkeiBP, August 2002.

(11) Bill Brogden, " Perfect guide of SOAP Programming by Java (Japanese Edition)", Technologies Criticism Corporation, November 2002.

(12) Web site concerned with IT (Information Technology): www.xmlconsortium.org/, www.unisys.co.jp, www.honda.co.jp/ACCESS/, www.sony.co.jp/index.html, www.verisign.co.jp, www.isms.jipdec.or.jp/, www.microsoft.com/japan/msdn, www.ibm/jp/services/ www.ebiz-ex.com/

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