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A Model for Evaluating the Effectiveness of the ASP Service Using Balanced Scorecard

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Abstract

An ASP is the service firms that provide a contractual service offering to deploy, host, manage, and lease what is typically packaged application software from a centrally managed facility. The bubble which was brought by a great expectation about ASP market from 2000 to 2001 made many ASPs to be disappeared. To survive in the intense competition and to improve effectiveness of the ASP services, it is necessary to acquire proper requirements by developing measures which consider various aspects of an ASP. However, these various aspects, namely multi-dimensions of them have not been implemented into these requirements. Therefore, this aims at suggesting new multi-dimensional measures by using balanced scorecard (BSC). Based on the measures through BSC, various properties for ASP requirements are extracted. The proposed concepts guarantee the fundamental improvements of ASP services.

Keywords: Application Service Provider, Balanced Scorecard, Measures

1. Introduction

For many years, firms have been advised to invest heavily in information and communications technology (ICT) to develop and sustain a competitive advantage. This message has been more forceful in the light of enhanced global competition and a constantly changing business environment (Khan et al., 2002). However, traditional information system required a lot of resources and effort for maintenance and repair. In a number of companies, about 70% of information technology (IT) investment has been spent on maintenance (Peabody, 2000).

Therefore, they want to concentrate their resources on core competitive power rather than IT maintenance and management (Terdiman and Berg, 2000). Technology development such as the rapid maturing of the Internet, the acceptance of browsers as the new application interface and increasing adoption of server-based computing, and changing market forces led to spread an IT outsourcing model in a rapid changing environment (Lim and Lee, 2003 and Kern et al., 2002). IT outsourcing was considered an important step in terms of the evolution of IT management in the 1990s (Lacity and Hirscheim, 1993).

An outsourcing Application service provider (ASP) is the new concept emerging from the foundation established in the outsourcing market. An ASP is the service firms that provide a

contractual service offering to deploy, host, manage, and lease what is typically packaged application software from a centrally managed facility (IDC, 1999). Table 1 summarizes the major differences between ASP and IT outsourcing (Cherry Tree & Co, 1999).

[Table 1] Distinction points between IT outsourcing and ASP (Cherry Tree & Co, 1999)

	Ownership of Applications	Location of IT Assets / Application	Location of IT support	Type of Applications
IT outsourcing	Client	Client or Provider	On- or off-site	Proprietary or Packaged
ASP	Provider / Third Party	Provider	Off-site	Packaged

Although clients who utilize ASP service do not have ownership of applications, clients using IT outsourcing service possess their application. This is critical difference between ASP and IT outsourcing.

According to IDC, an ASP market will grow to \$16.2 billion in 2003. Forrester research estimates that there are 300,000 emerging enterprises in the US with revenues between \$40 million and \$500 million and IT budgets of \$5 million or less. Less than 5% of the emerging enterprises in the U.S. will need to utilize an ASP solution to achieve this aim (IDC, 1999).

The hype generated by the IT industry claimed the ASP market would grow to \$25 billion by 2005, but many ASPs have not survived the dot.com downturn because of bubbles about the expectation of ASP markets (Currie, 2002). Although the ASP market size and a number of clients who use the ASP service have increased, a number of ASP and growth rate of the ASP market size have been decreased continually after 2000 (Gartner Group, 2000). Competition among ASPs to survive their competitors by the deteriorated situation will be strengthened.

In this situation, it is essential to improve managing and planning the ASP service based on performance measurement (Buglione and Abran., 2001), because “what you measure is what you get (Kaplan and Norton., 1992)”. The traditional financial performance measures worked well for the industrial area, but they are out of step with the skills and competencies companies are trying to master today. In other words, no single measure about finance can provide a clear performance target or focus attention on the critical areas of the business (Kaplan and Norton., 1992).

The balanced scorecard (BSC) presents managers with four different perspectives from which to choose measures. It complements traditional financial indicators with measures of performance for customers, internal processes, and learning and growth activities (Kaplan and Norton, 1993). Therefore it enabled companies to track financial results while simultaneously monitoring progress in building the capabilities and acquiring the intangible assets they would need for future growth (Kaplan and Norton., 1996). It is intended to link short-term operational control to the long-term vision and strategy of the business. In this way the company focuses on a few critical key ratios in meaningful target areas (Olive and Wetter, 1999).

The objective of this paper is to investigate what ASPs have to offer and what ASPs have to centralize to survive their competitors and succeed in competitive condition. In the present state of the ASP service, it is clear that the gap that exists between available and required IT resources and capabilities (Kern et al., 2002). In other words, what customer want to be served and what ASPs provide is not the same. Our research provided a compass for ASPs to

meet their capabilities and user requirements.

Based on documentation and interview with ASPs in Korea, BSC measures to evaluate effectiveness of the ASP service were extracted fully. Section 2 provides related works that study evaluating effectiveness about IT outsourcing, and using the BSC in ASP areas, before outlining the research approach to investigating BSC measures about the ASP service in five specific cases setting. Following the BSC procedure, we developed measures to evaluate the ASP service. This set forms the basis of the last part of the paper, which contains the conclusions, managements and suggesting for further research.

2. Literature review

2.1 Methodology for evaluating the ASP service

Currie (2003) developed a risk assessment framework for evaluating the deployment, hosting, and integration of web-enabled software application by ASPs. Knowledge based risk assessment framework is intended for small and medium businesses (SMBs), particularly those that do not adopt formal, project selection and management methods and tools for evaluating different vendor offerings. The framework incorporates key performance indicators (KPIs) in five categories: delivery and enablement; integration; management and operations; business transformation; and client/vendor relationship. However, most of KPIs are lagging drivers, because of only considering effectiveness the ASP service in external views of ASPs.

Leam and Lee(2003) provided the ASP certification framework and its process along with detailed control items of a ASP. Based on survey of 36 Korean companies' awareness, advantages, and concerns on the ASP service, results of the pilot certification were extracted. The definition of an ASP audit (Kim and Jo, 1998) was derived based on the definition used in the current information system. The scope and purpose of the ASP audit were determined based on the definition and its proposed framework. ASP service functions and performance were considered along with the life cycle phases in order to identify control items for the ASP audit. Finally, importance ratio of 4 control items of ASP audit about function and 9 control items of ASP audit about performance is identified. However, Audit items of ASP service functions and performance alone relate to qualities of the ASP service and are only lagging drivers.

Kern et al., (2002) offered what ASPs have to offer and how benefits and risks associated with the ASP model demand consideration form companies evaluating the ASP option. Using four case studies, six major propositions that customers should bear in mind when considering an ASP option was developed base on contingency model that combines resource dependency theory, resource-based theory, transaction cost theory and agency theory. However, six propositions are not metrics but generalized facts, so we can't directly apply them to evaluate the ASP service, although they can offer key consideration points evaluating the ASP option.

Kim et al. (2002) developed a hierarchical structure of ASP selection criteria and their relative importance using analytic hierarchical process (AHP) methodology. They evaluated in terms of credibility, appropriateness and efficiency. But, these criteria are extracted in limiting view because these only relate to only qualities of the ASP service.

2.2 Utilizing BSC in field relating to an ASP

Hafeez et al., (2002) provided a structure framework for determining the key capabilities using the AHP. The framework is applicable to benchmark a service sector organization. However, it is not comparison between ASPs and supporting criteria for selecting the best ASP although key capabilities help us to know specific critical departments.

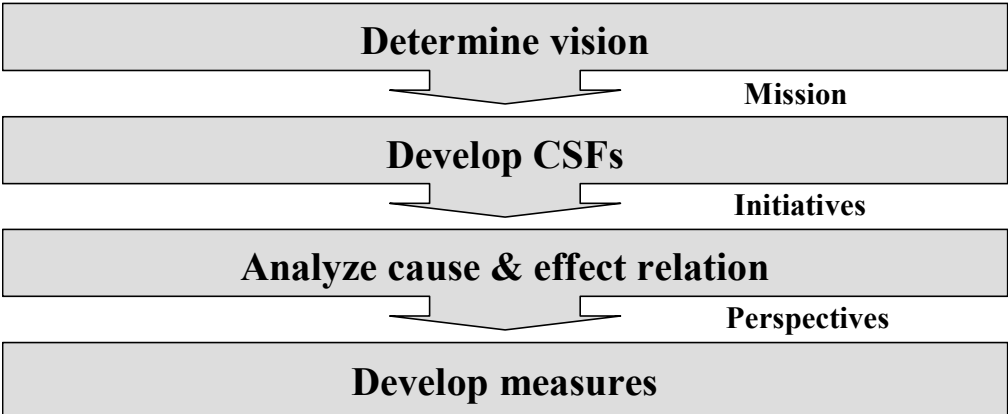
Ahn (2002) used four perspectives of BSC to identify the multidimensional outcome of a case study about utilizing the ASP service. He also found out effects of ERP among ASP services based on BSC.

3. Methodology

The data collection was undertaken from April 2003 to December 2003, through interviews and reviews of secondary documentation. The documentation included numerous press releases, internal documents such as company reports, presentation, and a detailed review of the companies. In addition, research studies from professional market research companies such as IDC, Gartner, and CherryTree Co and various research press article were collected. The use of multiple sources in data collection helps to scope a research study (Currie, 2003). Interviews were held with representatives of 5 ASPs in Korea. We also investigated two famous ASPs through e-mail and documentation. Data about 7 ASPs and documentation were the basis of ASP’s vision, mission, and critical success factors (CSF) of each perspective. To supplement CSFs and measures about the ASP service, we had an interview using a telephone with some clients in Korea. The semi-structured questionnaire was used to provide a framework for the interviews, and gave respondents’ the opportunity to interject where necessary. Semi-structured questionnaires, rather than open-interviews, may increase the reliability of data (Currie, 2003).

By using the BSC, an explicit vision and strategy underlie all four perspectives. And for each perspective, we formulate strategic aims, measures, and action plans. A continuous process centered on the BSC combines the four perspectives: in it the role of the BSC is to highlight what should be the focal points of the company’s efforts. The vision is made explicit and is shared. It is communicated in terms of critical success factors, and objectives. These are used to focus the work, allocate resources, and set targets. Therefore, we used the BSC to evaluate the ASP service.

Figure 1 illustrates our methodology procedure to develop measures for evaluation. The measures are extracted based on the BSC framework, which makes measures per a certain critical success factor (CSF) which belongs to a certain mission in a perspective. Each perspective has a mission, which is a detail and tangible purpose to accomplish the vision. By finding interrelationships among initiatives of an ASP and client goals, we can learn what should be done to achieve better outcome and what perspectives are important to achieve the outcome.



[Figure 1] Methodology procedure

3.1 Determine vision

It is essential to identify vision appropriately, because the BSC model is based on the shared comprehensive vision (Kaplan and Norton, 1992). Since the scorecard will give the organization a stronger focus than before, the consequences from a misguided vision must be extremely serious (Kaplan and Norton, 1996). In extremely changing IT developments and a world wide-depression, survival of an ASP turns out to be difficult. To compete with other ASPs, they must deliver more value to clients by providing the differentiated ASP service. Therefore we decide that the vision is “Become the preferred an ASP by providing the value-added ASP service for clients.” As a result, based on defined vision, corresponding missions can be extracted.

3.2 Develop mission and CSFs

The BSC should be viewed as an instrument for translating an abstract vision and strategy into specific measures and goals (Olve and Wetter, 1999). As Table 1 shows, we translate the vision of the ASP service into tangible terms of missions and determine perspectives for evaluation. To become the preferred an ASP, the ASP should contribute clients’ business value and also improve their satisfaction level. To assess them, the ASP must effectively manage and control processes for service delivery and prepare the future movement. Table 2 shows CSFs to lead mission per each perspective.

[Table 2] Mission and CSFs to evaluate the ASP service

Business Value Perspective	Client Perspective
<p>Mission: Contribute business value of clients</p> <p>CSFs:</p> <ul style="list-style-type: none"> ■ Decrease IT cost of clients (Kern et al., 2002, Cherry Tree Co., 1999 & Currie ., 2003) ■ Acquire business value by utilizing the ASP service (Martinsons et al., 1998) ■ Effectively manage the risk generated by the ASP service (Benoit et al., 1999, Khan et al., 2002, Currie ., 2003 Cheng and Koehler., 2003, Kern et al., 2002 & Groves ., 2003) 	<p>Mission: Improve the satisfaction level of clients by the value adding ASP service</p> <p>CSFs:</p> <ul style="list-style-type: none"> ■ Satisfy client requirements (Martinsons et al., 1999, & Olve and Wetter., 1999) ■ Achieve the SLAs (Leam and Lee., 2003, Kern et al., 2000, Waltson et al., 2000, & Kim and Jo., 2002)
Internal Process of an ASP Perspective	Learning and adaptability Perspective
<p>Mission: Effectively manage and control the ASP service</p> <p>CSFs:</p> <ul style="list-style-type: none"> ■ Provide clients with the effect and safety ASP service (Olve and Wetter, 1999, Kaplan and Norton., 1999) ■ Quickly and clearly solve problems of the ASP service (Martinson et al., 1999 Olve and Wetter, 1999, & Aubert, 1999) 	<p>Mission: Prepare the future movement of the ASP service</p> <p>CSFs:</p> <ul style="list-style-type: none"> ■ Improve the ASP Application Support Levels of clients (Kern et al., 2002, Leam and Lee., 2003 & Ahn and Buglion., 2002) ■ Adapt the ASP service to rapidly changing circumstances and IT developments (Kern et al., 2002)

3.3 Analyze cause and effect relation

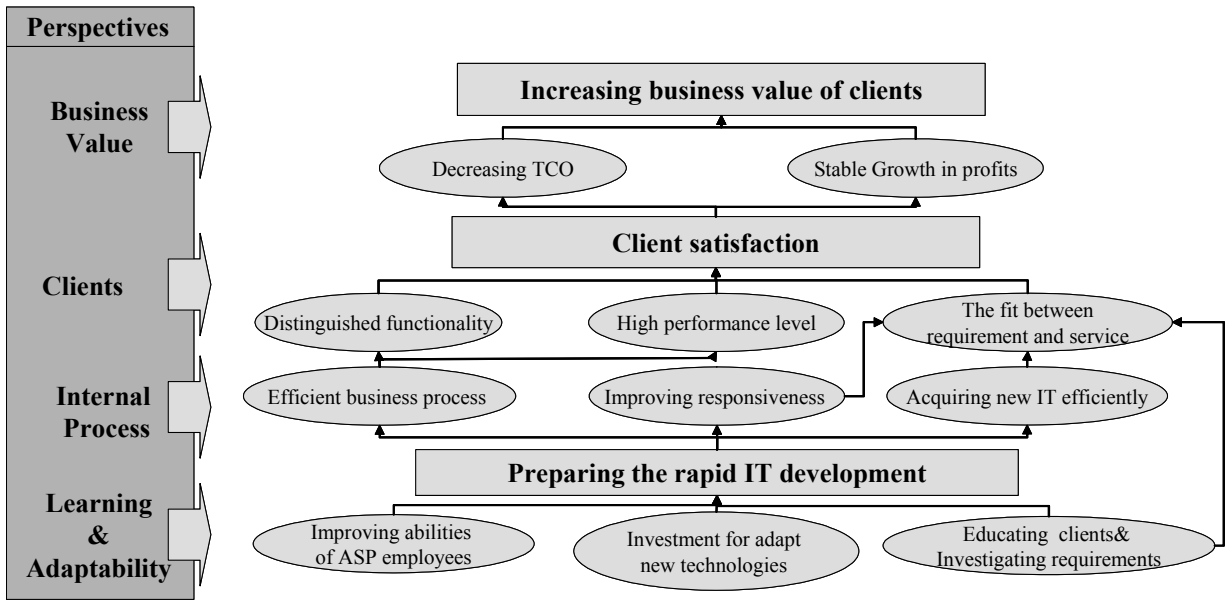
It is open emphasized that we should seek a proper balance between performance drivers and outcome measures. In other words, between measures which describe what we do and the effects achieved. Such chain of cause and effect may be very difficult to identify, one reason being that external variables often affect actual outcomes. But underlying every object-directed action is some conception of cause-and-effect relationships. The BSC aid us in discussing how today's actions can help set the stage for tomorrow. In BSC, the mix of drivers and outcomes should probably vary among the different perspectives. Therefore, we used the BSC.

Figure 2 shows the cause and effect relationship and corresponding perspectives. First, an ASP should prepare the rapid IT development and frequent change in demands. To cope with this situation, an ASP must rapidly cultivate its abilities to investigate requirements of clients. Also, it should concentrate on improving its core competency by emphasizing fundamental researches to adapt new technologies. Second, based on aspects of future readiness, an ASP can get efficient business process, high responsiveness and new IT efficiently. Third, effectiveness of internal process leads clients to satisfy the ASP service through outstanding functionality, performance level, and the finals product of ASP service. Finally excellent qualities of the ASP service makes clients to increase their value by decreasing Total cost ownership (TCO) and by gaining business value.

[Table 3] Company centric BSC VS the ASP service centric BSC

Company centric BSC	Focus	The ASP service centric BSC	Focus
Financial	Delivering value to our shareholders	Business Value	Contributing business value of clients
Customer	Delivering value to our customer	Client	Improving the clients satisfaction
Internal Process	Promoting efficiency and effectiveness in our business process	Internal Process	Enhancing efficiency & effectiveness of ASP processes
Learning & Growth	Sustaining our innovation and change capabilities, through continuous improvement	Adaptability & Learning	Preparing the dramatically changing IT

It is natural to consider changing the number of perspectives or areas of focus if as we have indicated the BSC should help us to guide the development of the business. Otherwise, transforming perspectives may lose some of its value (Olve and Wetter, 1999). Therefore, we revised original perspectives of BSC through cause and effect relationship diagram.



[Figure 2] Cause and effect relationship and related perspectives in the ASP service

Tradition BSC has four perspectives: financial, customer, internal process, learning and growth. We revise the traditional four perspectives to reflect characteristics of the ASP service. The revised BSC consists of the following perspectives: business value, clients, internal process, adaptability and learning. The traditional financial perspective only encompasses the control of the ASP service cost as well as the benefits. However, we can get more value by using the ASP service. Value is a much broader concept than benefits, and the ASP service can generate business value in many ways. Therefore, we transformed the financial perspective into the business value perspective. Furthermore we revise the customer perspective into the client perspective, because the customer of an information system established by an ASP is limited to clients under the contracts. Finally, it is very important to fit the ASP service to changing IT development, and an ASP must provide clients with the latest service enhancing their value. So, learning and growth perspective is transformed into adaptability and learning perspective.

3.4 Develop measures

In this step we develop key measures for evaluating the ASP service. Key measures are developed based on the CSFs and are refined by cause and effect relationship. Each measure should be reviewed with the view of each actor, clients and ASPs, because the actor related with each perspective is distinct. We place key measures on [Table 4], [Table 5], [Table 6], and [Table 7]. They don't show all aspects to succeed the market of an ASP, but show critical factors for success in the competitive market to an ASP.

We develop key measures for evaluating the ASP service. Key measures are developed based on the CSFs and are refined by cause and effect relationship. [Table 4] shows measures of business value perspective. For example, to estimate risks of the ASP service, we selected below measures; unexpected transition and management, number of pricing changes by ASPs, number of cost contractual amendment, and so on. The unit of Level of trust and security concerns is points by expert's decision. This measure is very important, because in the ASP service, data center is located in IDC, in other words, clients did not have data. Therefore they are afraid of loss of information and data. If clients did not have trust about ASP security, they could not utilize the ASP service.

[Table 5] and [Table 6] show measures of Client perspective and Internal process perspective. Client satisfaction index can be evaluated by using client satisfaction index of the ASP service, client satisfaction index of the ASP pricing and client loss ratio. Effectiveness of the ASP process can be evaluated ratio of reworks, time spent to repair bugs and fine-tune new application, and on time service.

[Table 4] Measures in business value perspective

Business Value Perspective			
Cost <ul style="list-style-type: none"> TCO (Kern et al., 2002, Cherry Tree Co., 1999 & Currie ., 2003) Percentage of the ASP service cost (Martinsons et al., 2002) 	<ul style="list-style-type: none"> \$ % 	Value Deliveries <ul style="list-style-type: none"> ROI (Millis et al., 2002, Martinsons et al., 1999, & Kaplan and Norton, 1996) Profitability per employee (Olve & Wetter, 1999) Ratio of strategy contribution (Currie, 2003, Martinsons et al., 1999, & Kern et al., 1999) Ratio of eliminating the IT problem 	<ul style="list-style-type: none"> % \$ % %
Risk <ul style="list-style-type: none"> Unexpected transition and management cost (Cross, 1995, & Earl, 1996) Number of pricing changes by ASPs unpredictable (Kern et al., 2002, & Cheng and Koehler, 2003) Number of cost contractual amendments (Kern et al., 2002) 	<ul style="list-style-type: none"> \$ # # 	<ul style="list-style-type: none"> Ratio of service debasement (Lacity and Hirschheim, 1993) Level of trust and security concerns (Khan et al., 2002, Groves, 2002, & Currie, 2003) Switching Cost (including lock-in) (Ahn, 1999) 	<ul style="list-style-type: none"> % Pts \$

[Table 5] Measures in client perspective

Client Perspective			
Client satisfaction index (Maltz et al., 2003, & Olve and Wetter, 1999) <ul style="list-style-type: none"> Client satisfaction index of the ASP service Client satisfaction index of the ASP pricing Client loss ratio 	<ul style="list-style-type: none"> Pts Pts % 	Key service of SLA (Kern et al., 2000, & Leam and Lee., 2003) <ul style="list-style-type: none"> Function effectiveness of the application Performance effectiveness of the application Fit between the business needs and the application 	<ul style="list-style-type: none"> Pts Pts Pts

[Table 6] Measures in internal process

Internal process Perspective			
Responsiveness <ul style="list-style-type: none"> Number of the ASP service which is applied to new IT technologies (Currie, 2003, Kern et al., 2002) Average time required to solve the client problem (Maltz et al., 2003 & Martinsons et al., 1999) 	<ul style="list-style-type: none"> # Hrs 	Effectiveness of the ASP process <ul style="list-style-type: none"> Ratio of reworks (Kaplan and Norton, 1993 & Olve and Wetter, 1999) Time spent to repair bugs and fine-tune new applications (Martinsons et al., 1999) On time service (Kaplan et al., 1993 & Olve and Wetter, 1999) 	<ul style="list-style-type: none"> % Hrs %

[Table 7] Measures in adaptability and learning perspective

Adaptability and Learning Perspective			
Application support levels <ul style="list-style-type: none"> ■ Average time executed to train and educate users (Kern et al., 2002 & Olve and Wetter, 1999) ■ Awareness of organization to introduce and utilize the ASP service actively (Ahn , 2002) ■ Abilities of end users utilizing the ASP service 	Hrs	Adaptability <ul style="list-style-type: none"> ■ Research budget as a percentage of the overall the ASP budget (Martinsons et al., 1999 & Olve and Wetter, 1999) ■ Ratio of the expertise related new IT technologies (Martinsons et al., 1999) 	\$
	Pts		%
	Pts		

4. Conclusion

To survive in the intense competition and to improve qualities of the ASP services, it is necessary to acquire proper requirements and to know critical factors by developing measures which consider various aspects of the ASP service. Therefore, in this paper, multi-dimensional measures for evaluating effectiveness of the ASP service are developed by using the BSC framework. A well-developed performance measurement system may give signals to senior management that something is wrong and that an ASP strategies has to be considered again. Measures provide not only a tool which makes clients evaluate the ASP service effectively, but also a tool which makes an ASP concentrate on economic number of success factors. In other words, because the resultant measures separate what a firm should necessarily consider from what would not so, the result of this paper enables ASPs to concentrate on requisites only.

This paper includes multi-dimensional measures in this paper that consider qualitative and quantitative aspects. The existing measures to evaluate the ASP service or an ASP were produced based on customer centric dimension, or facilities of an ASP. Limited view leads misunderstanding results of the ASP service, and can make ASP market difficult. However, because based on BSC we cover various aspects, we can get multi-dimensional measures which inform an ASP that their condition become bad or good.

In our research, some measures are difficult to be evaluated with real value, because we focus on developing them in terms of top level executives. We can break down and embody measures more and more by focusing on subordinate executives. This research does not have case studies which demonstrate the feasibility of the proposed methodology and measures. When we acquire the value per each measure, the effectiveness of the ASP service can be evaluated with total score which represents integrated value of all measures. However, the model for calculating total score having the value of multidimensional measures is not considered in this research, because this area is not our interest.

We suggest that further research should investigate measures in larger scale case study to validate whether these affect mission or CSFs. Furthermore, we can know important key measures through a relative ratio between them.

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