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Outsourcing Network Management

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Abstract

The paper analyses the current situation in outsourcing of IT and network management through the literature review and examples in industry. We have focused on trends, benefits and risks in outsourcing network management and made proposals to address the problems through a carefully managed network outsourcing relationship. The available statistics and the survey of six UK companies has revealed that the upfront negotiation of service level agreements should be one of the most important aspects of conducting the outsourcing of network management.

Keywords: Outsourcing, network service management, Service Level Agreements.

1. Introduction

Outsourcing has become increasingly prevalent in the realm of network services and their management. Although large corporations continue to outsource IT services, the issues of whether and how to outsource network management operations generate strong emotions amongst IT managers and raise many questions. In this work our aim is to identify some of the key problems of outsourcing network services and to propose an approach for addressing them. We study the problem from the trends in outsourcing for managing network growth, to risks and disadvantages of outsourcing network management services. The essence of our approach is to emphasise vendor selection and service level agreements (SLA) when managing a network outsourcing relationship. We evaluate our approach by looking at six carefully chosen large UK companies from different industries and assessing if they share our concerns when outsourcing network service management. The results confirm that the major obstacles we identified for companies outsourcing IT are correct. When choosing an outsourcing partner,

the companies we examined, pointed towards the SLA as their key consideration.

In section 2 we introduce outsourcing; we give its scope and bring in outsourcing network management. Section 3 highlights trends in outsourcing network management and section 4 discusses the problems associated with it. In section 5 we discuss our approach for addressing the problem, with emphasis on the management of Service Level Agreements (SLA's). Section 6 evaluates our proposal by giving some statistics, outlining related works, describing the survey conducted and analysing its results. We conclude in section 7 and give pathways for future work.

2. Outsourcing IT and Network Management

With the bursting of the Internet bubble and the slowing economy in the late 90s, many companies were forced to shift their focus from acquiring new technology to better utilisation of resources and equipment. Inevitably, it meant cutting expenses and decreasing investments to achieve improved profitability. In such situations outsourcing has always been the first consideration. Under traditional outsourcing, the provider assumed ownership of the relevant assets, and then leased back implementation and support services under a formal contract [18], hence having large scale, multi-year agreements. Today the term outsourcing has expanded to include more flexible, streamlined support options like end-to-end managed services that include taking responsibility for the outsourced assets, but not necessarily transferring any assets. Public partnerships, acquisitions, larger outsourcing firms and evolving customer needs are all forcing the definition of outsourcing to broaden.

“Information technology outsourcing is the practice of turning over all, or part, of an

organisation's IT to an outside vendor" [1]. The increased pressure to reduce costs means: becoming more competitive, getting closer to the customer, keeping abreast of new systems and networking technologies, attracting and retaining competent professionals, and maintaining organisational flexibility.

The IT outsourcing market in general is growing, although there has been a recent slowdown in the IT infrastructure services as a result of the recent economic climate [28,9]. Current trends are towards providing services to smaller businesses and in product segmentation, i.e. providing a range of service possibilities rather than taking over the entire IT operation [4]. The IT outsourcing market currently offers the services for: web hosting, network security services, network management, storage services, web services, application services and consulting services.

An arrangement in which an organisation utilises external resources to provide communications network and/or application support can be defined as network management outsourcing [12]. The range of network outsourcing alternatives is expanding to include managed services, utility computing and business process outsourcing. Today's businesses are able to choose from an ever-growing portfolio of support services that can be configured to address a customer's specific financial, expertise and control parameters.

3. Trends in outsourcing network management

Outsourcing network management is one of the few segments of the IT industry that is experiencing steady growth in an otherwise gloomy business environment [15]. If implemented correctly, outsourcing network operations can mean the simplicity of having one provider, one network, one point of contact and one level of expected quality [24].

According to Mark Halper [7] when industries are down on their luck, they invest heavily in technological services and outsourcing to help them out of their financial crisis. This is evident from the last UK economic recession in the early 1990s. The arrival of the Internet into the commercial world has initiated a growing trend of companies relying on global fibre networks

for sending everything from simple messages, to timely one-to-one information and video presentations. The idea is to bring applications, information and networks into one system, providing workers around the world with access to information at any time, anywhere and in the form they require it.

We compile our own list of drivers behind trends and increased interest in outsourcing network operations from sources like [24,12,8,27,3]:

More complex technologies - More robust converged network management and monitoring services that are offered by outsourcing, can look attractive to an enterprise that lacks in-house technical expertise.

Business continuity across the entire network - Different business locations, multiple communications platforms, virtual offices and various types of operations can add up to a chaotic collection of performance standards, resulting in a decentralised, inconsistent approach to network management and sub-optimisation of network performance.

Increase in outsourcing options - There has been an increase in modular outsourcing alternatives. These 'bite-sized' external support offerings are far away from the more traditional all-or-nothing outsourcing approach.

Single partner with multi-vendor expertise - A "one-stop shop" for maintenance and managed services across multiple networks can provide convenience and integrated trouble-shooting, thus improving the economics of outsourcing for the enterprise.

Ongoing scarcity of technical expertise - The shortage of qualified IT staff, the over-burdening of network management staff whilst, at the same time, requiring additional resources, are driving the trend for network outsourcing.

3.1. When to Outsource Network Services

Attitudes towards network operations are similar to those of personal health. In both cases, the signals that there is a need for outside help are often ignored until some serious event forces a change in attitude [2]. Therefore before committing to third party support, we put forward some indicators that we think can help organizations decide whether network operations are a candidate for outsourcing. We give below our selection of indicators which we believe are particularly relevant to the current dynamic technological and economic environment:

Rising IT expenses – very common when a company's network grows organically rather than methodically.

Increasing network instability – growing problems related to file sharing, email corruption and Internet access should not be overlooked.

Security overwhelming business operations -. If there is a constant demand to identify, obtain and install security upgrades to operating and individual applications, then often networking functions will be ignored.

New regulatory compliance requirements - If the Government or the regulatory authority decides to introduce new regulatory compliance requirements for an industry, networking tasks are neglected, i.e. implementing the new compliance requirements takes priority over maintaining a well-run network.

Reorganisation – organisational restructuring and external environmental changes can have a profound effect on network operations although they may not be immediately apparent.

3.2. Why outsource network functions?

Outsourcing network operations can provide a significant competitive advantage to businesses. If an enterprise is in a rapidly evolving market, it might not have the time to invest in establishing or maintaining a large network infrastructure. By outsourcing the network operations the company can focus on its core competency and getting to market quickly. This also enables an organisation to free up internal staff to concentrate on long-term projects. Another advantage of outsourcing is vendor specific experience. Eliminating a network operations centre (NOC), or avoiding the cost of building an internal NOC, can provide immediate and substantial cost savings. Network performance has never been more important and therefore, by outsourcing network operations, enterprises can improve customer retention, reduce network downtime and service degradation events leading to the optimisation of network facilities usage [20].

The most comprehensive list of reasons for outsourcing network management, which supports our views, can be found at [29] and are summarised as:

- Avoiding large capital investment in technology that will become obsolete.
- Fast acquisition of state-of-the-art technology.
- Offloading routine, high cost services such

as network maintenance.

- Being adaptable to changing market conditions through the outsourcer.
- Responding effectively and efficiently to an increasingly complex, distributed network environment.
- Sharing risks through co-sourcing

4. The Problem

4.1. Disadvantages of Outsourcing Network Operations

Outsourcing is a partnership and does not mean turning over the whole operation to a third party. The enterprise must manage the relationship, track the vendor's performance and retain enough staff for planning, design and charting their own networking future. As the role of network management within an organisation expands and grows it is important that an enterprise evaluates its IT support needs. The ramifications of a poor outsourcing decision by IS management can set back the effectiveness of the enterprise [11].

Many organisations discovered that the projected cost savings from outsourcing were overstated, and that they were locked into an inflexible contract. As a result companies have had to set-up internal contract management teams to oversee the agreement, to make sure the process runs smoothly and to focus on avoiding oversights. This has resulted in increased costs rather than savings. Sometimes outsourcing negatively influences staff performance. This can lead to reduced control over strategic network services, resulting in limited or no contribution to the enterprise's objectives. Under such circumstances outsourcing may not be the wisest option. In [13,] we find that short term outsourcing gains can become long-term liabilities by:

- Lowering the morale of remaining staff.
- Loss of highly skilled and talented employees.
- Generation of unrealistic expectations among all parties.
- Outsourcing partner's lack of knowledge about the organisation.
- Getting locked into complex and inflexible contracts.
- Losing control of network services to the outsourcing partner

4.2. Risks of Outsourcing Network Operations

As many large and some medium size organisations continue to outsource their network operations, many professionals consider smart or selective outsourcing as a sensible approach to balance efficiency and effectiveness in providing network/IT services. However, there are many risks of outsourcing network operations, which are debated and analysed in [4,5,24]. However, we chose to discuss only risks that are difficult to measure and often overlooked while making outsourcing decisions:

Weak Management - IT executives should be able to manage third party contracts and relationships.

Inexperienced Staff - The possibility of vendor having better IT specialists does not necessarily mean that the vendor has the best expertise or solid experience.

Business Uncertainty -. When cost is the driver of outsourcing it is likely that the company will sacrifice important competencies and capabilities.

Outdated Technological Skills - When an enterprise outsources its network operations, how can it ensure that the vendors' skills are up to date? The enterprise may end up buying legacy-networking skills and therefore the objective of minimising costs is further diminished

Endemic Uncertainty - The rate at which network technology, business requirements and user needs are changing and developing, gives rise to uncertainty itself.

Hidden Costs - Companies' tend to underestimate the set-up, management and other parallel running costs (thus, network outsourcing may not be as profitable as it seemed to be initially).

Lack of Organisational Learning - Managing network operations successfully comes from experience and enterprises can become informed buyers only if they have some experience. So, one argument can be that organisations must in-source before deciding to outsource future technologies.

Loss of Innovative Capacity - By outsourcing network operations a company may lose its ability to maintain its innovative capacity in IT in the long run. Innovations cannot be bought and there might be vendors who are innovative but cannot implement the ideas.

Fuzzy Focus - Outsourcing network operations is generally concerned with the supply side of IT. By outsourcing, enterprises may be able to develop a new architecture, but this will not help them achieve sustainable business- added value or competitive advantage

These risks do not occur in every outsourcing decision, but they are not unusual. However, these risks can be avoided or reduced by carefully selecting sourcing. A company's big gains are likely to come from concentrating on IT enabled business transformation and, particularly, on focusing how to deploy it to improve the business's revenue [17].

5. Our Approach

In the light of the analysis given in section 3, we propose to address the problem of outsourcing network management through:

- (i) selecting the vendor carefully to meet the company's needs and requirements and
- (ii) managing the outsourcing relationship effectively.

In the next 2 sections we justify both (i) and (ii) through the literature survey and discuss managing of SLA in section 5.3.

5.1. Selecting Vendors When Outsourcing Network Management

Effective outsourcing agreements are considered as a marriage and referred to as '*engagements*' which explains their significance and the contracts are getting more complex as they offer increased services. In other words companies are buying relationships that need sophisticated contracts rather than products [5,23].

Before deciding on the right outsourcer there are a number of key considerations that can lead to a successful outsourcing relationship. When looking for an outsourcing partner an enterprise should consider:

- *Alignment of expertise* - getting the vendors with the right expertise is crucial;
- *Multi-vendor support*- an ideal outsourcing partner should have the expertise of multiple platforms and should be able to remotely manage/support all the platforms covered in the networking agreement;

- *Risk management*- the agreement with the outsourcing partner should include acknowledging risks, with potential problems identified up-front plus assurances and contingencies in the overall plan;
- *Alignment of business objectives*- the key questions are: will this agreement help to reduce cost-grow revenues, free up resources to work on future business enhancements, increase customer satisfaction and retention and improve ROI and return on assets?

Robin Mejjia [23] observes that the financial strength of a partner, project management skills, security capabilities, ability to provide global coverage, pricing and the willingness to consult and customise services should also be a part of the critical checklist before selecting an outsourcing partner.

5.2. Managing a Network Outsourcing Relationship

Service level agreements (SLA) are contracts that specify the performance parameters within which a network service is provided [19]. Organisations view them as a crucial element in the process of running network services at peak performance. They can define parameters such as type of service, data transfer rate, expected performance level in terms of delay, poor network availability, network uptime, systems repair and network restoration. The growing use of SLA's has led to the development of performance measurement and reporting tools, that both parties can use to make sure that network performance does not fall below agreed thresholds. Today SLA's are used for a wide range of network services such as Virtual Private Networks (VPNs), web hosting services, intranets and extranets.

The SLA is critical to developing a good relationship with the outsourcer and some of the important issues for setting up effective SLA's are [28,6]:

- Demanding continuous improvement and setting realistic rewards and penalties.
- Carefully modelling service requirements to your own business requirements.
- Defining terms of the agreement carefully, specifying how they will be monitored.
- Protecting important items such as critical

servers by providing special requirements in the SLA.

- Asking for only what you need, and be certain that it is cost effective.

5.3. Managing Service Level Agreements

There are various strategies for managing SLA's successfully [1,26]. In this paper we choose a different view of managing a network outsourcing relationship through the following:

(a) *Hard Side of Network Outsourcing Management*

The hard side of network outsourcing management encompasses the development and enforcement of a good contract. The quality of the contract has a huge impact on the outcome of the outsourcing efforts as it helps to protect the organisation from the potential opportunism of the vendor. Thus a good contract must have the following characteristics:

- *Preciseness*- ill-defined contracts generally result in high IT costs and poor IT service levels. It is important that cost and performance requirements are established from the beginning and clearly specified in the contract [25].
- *Completeness*- writing a contract which is as complete as possible has important benefits. A complete contract reduces the exposure to the potential opportunism of the vendor and costly renegotiation [22].
- *Balance*- generally one sided contracts do not last long. If a contract is weighted against the vendor it is not necessarily beneficial for the client, as the vendor will try to win back some value by imposing extra charges [16].

(b) *Soft Side of Network Outsourcing Management*

The soft side of managing SLA's refers to the development of relationships based on trust. Trust can be defined as the expectation that the vendor will not take advantage of the client or vice versa, even when the opportunity is available[30]. Trust provides an environment in which partners can achieve individual and joint goals, and lowers transaction costs. When contractual hazards are low, it is easy to manage outsourcing relationships with the hard side. However, when contractual hazards are high, managing a contract becomes increasingly difficult. This is when the soft side becomes

important [22].

(c) How to Improve Management of SLA's

The key to developing good network outsourcing contracts is experience. An enterprise can improve the management of SLA's by:

- Resorting to outside consultants
- Hiring people who have been previously involved in IT outsourcing management
- Analysing the vendor's reputation
- Only using "known" vendors

5.4. Our Hypothesis

Network management outsourcing provides both high rewards and high risks. Due to the rapid pace of global change, most national and multinational corporations across the world are becoming more dependent on network outsourcing and consequently vendors have to deal with more and more complex technology systems, networks and functions. To obtain maximum value from network outsourcing companies need to plan, manage and control the process. The ideal outsourcing partner should be knowledgeable about the firms business, its applications and its technology needs.

However, as discussed in sections 3 and 4, although network outsourcing is increasingly important, there are key questions that companies need to ask themselves before taking that crucial decision of outsourcing network operations. They have primarily to answer some of the following questions:

1. When should you outsource network operations?
2. How do you manage a network outsourcing relationship?
3. How do you achieve the balance between network outsourcing and control over the outsourced operation?

We believe that the above factors are the main concerns of many companies today. We also advocate – as discussed in section 4 - that companies should emphasise the management of network outsourcing relationships through:

- (i.) carefully choosing outsourcing partners and
- (ii.) managing service level agreements.

These two factors should play the most important role when deciding on outsourcing the network management operations.

In the next section we attempt to see if our hypothesis holds. The answer to question 1 above can partially be found in section 3. In order to establish whether the concerns of companies today correspond with the issues discussed in 3.1; 3.2 and 4.1; 4.2, and whether companies should adopt our approach from 5.3 when addressing these concerns, we asked six carefully chosen companies in the London area to answer the questionnaire. Thus at the same time we collected some views and answers on question 3. For question 2 above we followed a set of guidelines from section 5.3 which emphasized the need to manage the SLA. It is difficult to prove that our proposal works for any company and of any size. However, we will be able to apply the complete proposal to a large Asian company located in a developing country. This company has already highlighted the need for outsourcing their network management.

6. Evaluating our Approach

6.1. Available Statistics and Related work

THINK strategies & BCR [13] conducted a survey in April 2003 for which they interviewed network/IT managers, directors and other decision makers and collected responses from 200 different firms. Table-1 shows the most common reasons for outsourcing network operations deduced from the survey.

The respondents were then asked how they managed their network outsourcing relationships and the most common method was service level agreements. The results are demonstrated in Table-2.

The results from Tables 1 and 2 correlate to our discussions and analysis given in section 2 and 3. We also found that the up-front negotiation of SLAs has been the most important aspect of conducting the outsourcing of network management.

<i>Reasons</i>	<i>Respondents</i>		
	<i>Current Customers</i>	<i>Customers considering</i>	<i>Non-Customers</i>
Reduce head-count and other costs	64.3%	45.5%	74%
Improve service quality/ Reliability	25%	18.2%	11%
Add new functional capabilities	7.1%	9.1%	3.0%

Table-1: Reasons for outsourcing network operations

<i>Method</i>	<i>Percentage of Respondents</i>
Negotiate SLAs up front	40%
Monthly service provider reports	40%
Informal process	25%
Regular meetings	20%
Penalties	15%

Table-2 Source: International Network Services, 2003: How firms manage network outsourcing relationships?

It has been very difficult to find any similar work that has both academic concepts and practical experiences. There are many works that talk about outsourcing IT functions generally but they do not specifically cover outsourcing the network management. Some areas that were found interesting and that needed to be researched more are related to outsourcing and (i) network security, (ii) LAN/WAN network management and (iii) specifically mobile networking, which proves to be challenging for both vendors and companies.

During the compilation of this paper we came across a few white papers that were somehow related to our work, despite being on the other side of outsourcing. We list here the three companies, which are providers of network management services, and which have printed their own roadmaps to outsourcing network

services with respect to the products and services they offer. In their papers they describe how they approach network outsourcing and how their products help to resolve the networking problems experienced by various enterprises.

Adventis'

http://www.adventis.com/news/pr_20050125.shtml

motto on outsourcing is available at their web site, **Compass Technology Management**

policies on outsourcing and other products is at <http://www.compass.net/s2/whatwedo/services/dels/outsourcing/>, and **International Network**

Service's white paper on outsourcing and LSA is available

at http://www.ins.com/downloads/surveys/sv_slm_sla_0302.pdf

6.1. Conducting a Survey

We conducted a survey to see if our discussion from section 4 holds and if some questions asked in section 4.4 can be answered. The emphasis was on determining what caused firms to outsource their network operations, what qualities did they look for while choosing a vendor and what approach did they adopt to manage their network outsourcing relationship. The questionnaire consisted of nine questions with prepared answers. We asked:

1. Does your company outsource any IT functions?
2. Which IT functions should be outsourced and which should be in-house?
3. What benefits has your company experienced from outsourcing?
4. What disadvantages has your company experienced from outsourcing?
5. Which factors influenced your decision to outsource network management?
6. Which factors influenced your decision NOT to outsource network management?
7. When choosing an outsourcing partner which factors did your organization consider?
8. What management techniques or approaches did you consider when outsourcing?
9. Which activities did your company find the most difficult to adopt when outsourcing?

We anticipated that large national and multinational companies would be reluctant to

reveal their sensitive data on outsourcing when answering our questionnaire. Consequently we ruled out any large-scale survey and opted for a modest choice of companies, which expressed very positive views of our work. These companies promised they would collaborate, discuss certain sections of the research with us and answer our questionnaire. The questionnaire was given to people from the IT departments of the chosen companies and they arranged for them to be completed by their respective IT managers. We have guaranteed these companies anonymity; hence all the names of companies and contact people who completed the questionnaires ca not be revealed in this paper.

Table-3 shows to what sector the companies belong and the approximate number of employees working in those companies. As evident from the table below although the number of companies involved in the survey is small, we can say that these companies are one of the major players in the sector they represent.

No.	Industry Sector	No. of Employees (appx.)
1	Health	1200
2	Transport	2000
3	Financial services	600
4	Online retailer	450
5	Financial services (accountancy)	200
6	Leisure and Entertainment	2500

Table-3: Companies used in the survey.

6.2. Results

The results of the survey conform to all the key issues discussed in this paper, which can be found in sections 2 and 3. In response to what was causing companies to outsource network operations, five companies pointed towards overwhelming network security and growth in network operations as the key reason. Six companies based their decision on selecting a particular vendor for its expertise, financial stability and technical expertise. However, only 2 companies were using SLA's and they were finding it difficult to negotiate them or to achieve the desired results. The main problem with the SLA's was that they were not flexible enough to change with the dynamic business needs.

The most interesting findings of the survey are:

The company from the transport industry is outsourcing its networking management and IT security and is reluctant to continue with more outsourcing due to increased costs and inability to identify benefits. They have experienced problems with their SLA, which they found inflexible and incapable of responding to business changes in long-term contracts. The company did follow some aspects of our approach given in (i) and (ii) from section 5.4 and (a)-(c) from section 5.3 and employed both the development of a relationship based on trust and enforcement of a good contract.

The company from the leisure and entertainment industry is not outsourcing its network management because it wants to retain its ability to develop valuable competencies in-house. It only outsources its IT security.

Both companies from the financial services sector outsource network management services, but they did not include any consideration of SLAa or any aspect of our proposal given in section 5.4. They were interested in enforcing a good contract when outsourcing network services, and were extremely keen to analyse experience, financial stability and technical expertise of chosen outsourcing partners. Both companies benefited from reduced costs, improved performance and service quality improvements.

The online retailer outsources the network management, which allows them to focus more on core business and improve service quality. However, the most difficult process for them was in achieving the desired result from outsourcing whilst managing long-term contracts and having reduced the ability to develop valuable competencies in-house. This is yet another case where our proposal could have improved their results if (i) and (ii) from section 5.4 and (a)-(c) from section 5.3 were undertaken.

The company from the health sector is very specific, but their answers are similar to others: they were not able to enforce, or even negotiate, a good contract for outsourcing network management. They faced inflexibilities when their business needs changed and discovered hidden costs in the outsourcing arrangement.

7. Conclusions and Future Work

Growing concerns for network security and stability are placing pressure on organisations to outsource their network services and this has also been confirmed in literature [2]. Service level agreements are becoming increasingly popular to manage network outsourcing relationships. We have discussed this approach in section 5.3. Organisations are becoming more selective when looking for a vendor and are now demanding more value ranging from technical expertise to innovative capability.

Based on the issues discussed in this paper and the issues that arose from the research and analysis of the conducted survey, we conclude that the model presented below is comprehensive and may help companies to outsource network operations. Although, the model may appear commonsensical in most respects, it has been derived from the experience of those who have managed this extremely complex operation within substantially large companies. We acknowledge that a number of soft issues will always constitute risk. In particular, the contract is with a company, not an individual, that relies on transient skills and knowledge. Such skills and knowledge may exist at the time of the contract but cannot be relied upon for its duration. Also, tightening the contract in order to exact penalties from the contractor for any loss of income, may simply represent a pyrrhic victory in reality. Contracts that involve such a strong element of dependency must operate better when there is goodwill and trust between both parties. We know the desire to outsource is increasing and in this model we try to cover all aspects of network outsourcing. The model is not presented in a particular order, in-fact we believe that the network outsourcing process should incorporate all the areas specified below when considering a potential vendor:

1. **Network Management Analysis:** Identify needs and requirements, assess growth and profitability and categorise IT operations.
2. **Network Management Outsourcing Strategy:** Define the strategy, set goals, identify objectives and then communicate and discuss the strategy with the staff affected.
3. **Financial & Business Analysis:** Develop a comprehensive revenue, cost and capital expense plan. Conduct risk analysis and identify the required support infrastructure.

4. Training & Development and skills analysis: Define key performance metrics and deliver relevant training.

5. Implementation : Define the solution in detail, deploy a focused program to implement the solution and identify changes required

6. Value proposition: Employ value-based pricing, develop service level agreements and assess vendors skills and expertise.

In future we plan to do the following:

1. Apply our proposal from 1-6 above to a large Asian company, which has already expressed a need for outsourcing network management. This will provide an additional opportunity for evaluating our proposal.
2. Analyse roadmaps for network management outsourcing devised by various companies in industry – a few of them are mentioned in section 6.1 – and juxtapose them to our approach.
3. Revise the questionnaire and survey UK SMEs in order to see current outsourcing trends within small companies.

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