

DESIGN OF INFORMATION TECHNOLOGY GOVERNANCE IN THE INFORMATION TECHNOLOGY DIVISION OF PT PLN USING THE FRAMEWORK COBIT 2019

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ABSTRACT

In order to support the company's main business objectives, PLN UP3 Manokwari has implemented Information Technology (IT) which is structurally managed and implemented by the information technology division. However, information technology management in the IT division has not yet implemented information technology governance. To support the ongoing management of information technology, the information technology division of PLN UP3 Manokwari still uses the system manually. Manual management of information technology has many risks, this causes the company's main business objectives to not be achieved optimally. The method used in this study refers to the 2019 COBIT framework. From data analysis, it is known that the level of capability of the selected IT governance process in this study is the process in the domain EDM03, APO03, APO12, APO13, BAI01, BAI03, BAI06, BAI07, BAI11, and DSS05 are mostly still at level 2, while the capability level expected by companies is mostly at level 4. The results of this study are in the form of recommendations for improvements aimed at achieving the expected level of capability by companies and design of IT governance as a reference for the IT Division PT PLN UP3 Manokwari in managing better IT processes to support the achievement of the company's main business objectives.

Keywords: *Design, Information Technology Governance, COBIT 2019, Divisi Information Technology PLN UP3*

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1. INTRODUCTION

Information technology plays a very important role. Along with the development and utilization of IT, every activity immensely depends on the reliability and availability of IT services [1]. Currently, systems and information technology support almost all areas of business, both directly and indirectly [2]. Information technology (IT) plays an important role in supporting the activities and business processes of an organization [3]. The alignment between business processes with information technology becomes a challenge that every company must go [4]. Information Technology (IT) can create business value [5]. Information and related information technology (IT) resources have become core to modern-day businesses [6]. Information technology (IT) has become crucial impact for the business in the organization [7]. The relational mechanism between

IT and business is a determining factor for IT performance, and also positively correlates with organizational performance [8].

Application technology information requires governance which is often referred to as information technology governance (Governance Information Technology). The application of information technology must be planned systematically due to limited resources and the need for quality information, therefore governance is needed that can be used as a guide in the application of information technology in companies. In managing data processes, information technology governance is an important asset management for companies [9]. For organizations, Information Technology (IT) is very important, therefore, IT Governance consists of Leadership, processes and organizational structures that ensure that the

organization's strategies and objectives are leveraged by IT [10].

The competitiveness of an organization depends heavily on IT governance because good IT governance can help organizations maximize the benefits of implementing IT [3]. IT governance is a company's effort to analyze the effectiveness of IT use [11]. IT governance was geared toward quickly responding to the needs of the business units [12]. In order to achieve business goals, managing IT Governance is of utmost importance. Its main purpose is to ensure the accountability of the process of it and how to control IT effectively and efficiently in increasing the value of the business [4]. IT services with good governance tend to significantly affect business performance overall [13]. IT Governance plays a role in identifying differences in management and optimizing company performance [9]. When a company's IT services are not managed properly, it creates problems such as unplanned operating costs, suboptimal use of funds, poor decision making, poor service management and can pose risks that can harm the company [14].

Information technology governance is currently a major concern in the development of IT-based services. The need to provide credible and transparent high-quality IT services drives every company, whether in the private or public sector. The success of technology implementation is influenced by company performance. The main problem that causes the failure of ITG (Information Technology Governance) implementation is IT operations [15]. Based on this understanding, it can be seen to what extent these visions and objectives can be translated into actions and governance in each existing unit or department. Especially if you see that investing in IT implementation is not cheap. In the private sector, IT management is used to carry out operational activities, where as in the public sector it is still used in a limited way as a tool to support company management [16].

Information technology governance is the process of controlling information technology assets based on a framework for achieving the company's vision and mission [17]. Effective information technology governance provides a framework that enables companies to leverage information technology capabilities and manage innovative practices [18]. Companies belonging to industries whose strategic role of IT is to transform business processes are more aware of the COBIT framework for governing and managing IT, enabling a better IT performance . Information technology governance is a system designed to direct the management of the company in a professional manner based on the principles of transparency, accountability, responsibility, independence, fairness and equality. Information technology governance is part of corporate governance that focuses on information systems

and technology as well as performance and risk management. Corporate information technology governance is useful for directing and controlling companies so that they comply with laws and regulations, comply with stakeholder expectations, and comply with applicable business norms and ethics.

Best practice of information technology governance frameworks should be able to see further the use of information technology and the obstacles faced by IT functions in supporting organizational goals [19]. There are several frameworks that can be used in assisting companies in the process of implementation and assessment of IT Governance. One of them is the Control Objectives for Information and Related Technology (COBIT) framework which have been widely recognized and accepted as a tool for IT governance [4]. COBIT is the abbreviation of Control Objectives for Information and Related Technology, and it is an internationally-recognized advanced and authoritative standard for the management and control of security and information technology at present [20]. COBIT is a standard that functions to provide direction for IT governance and management which is used by management, auditors, and users as a bridge to separate control needs, technical issues, and business risks [21]. COBIT is a framework that focuses on providing direction to companies to meet the information needs of organizations, controlling IT resources through a structured process with the goal of creating the IT processes needed by the company [22]. COBIT provides detailed IT Governance and control objectives framework for managers, business process owners, users, and auditors because it manages information technology holistically so that the value provided by IT can be achieved optimally by taking into account all aspects of IT governance [3]. COBIT is a control framework of information technology that serves to establish IT alignment with businesses [23].

COBIT is known as a framework with a wide range of topics. COBIT 4.1 framework guides in creating a classification scheme that consists of about define the level of security and protection control; make plans for acquisitions technology infrastructure; ensure availability and protection of infrastructure resources; infrastructure maintenance; and environmental due diligence needed to maximize IT usage [24]. COBIT 4.1 updated to COBIT 5, COBIT 5 help organization to define their policies and process used for IT control in all organization areas, so it can improve organization quality and value [25], then COBIT 2019 is the latest version and gets a major update from the previous version, namely COBIT 5 [26]. COBIT 2019 is the latest version of COBIT and a refinement of COBIT 5 [9]. Based on the 2019 COBIT framework, improving the scope from 5 to 11 can be used to improve the scope of management and governance of an enterprise, namely the enterprise IT threat landscape, compliance

requirements, the role of IT for the company, enterprise IT resource model, IT implementation methods, strategy companies in adopting IT and company size [27].

Over the years, framework best practice has been developed to help organizations understand, plan, and implement information technology governance. COBIT is one best practices for the management and governance of corporate information technology. COBIT continues to evolve into a broader and more comprehensive information technology governance and management framework. One of the COBIT development products released in 2018, which was created by integrating more than 25 years of development, is COBIT 2019 [28]. COBIT 2019 development is based on two main classification systems, classifying the five COBIT 5 development principles and one new additional principle categorized into governance systems and another three new additional principles categorized into governance framework.

The new COBIT version according to ISACA is more straightforward and focuses on new areas: SME, cybersecurity, digital transformation, cloud computing, privacy, and DevOps. Establishing IT governance is becoming facilitated as many frameworks are becoming more enhance by getting more understandable and straightforward [29]. COBIT 2019 has chosen because of its flexibility and openness, which is suitable for small size organizations that lack the resources sufficient to implement good IT governance. And COBIT is a framework that can help the implementation of IT Governance by considering all aspects both in terms of people, skills, competencies, services, infrastructure, and applications [30].

The State Electricity Company (PLN) UP3 Manokwari is one of the Implementing Units of the State Electricity Company Limited Liability Company. PLN UP3 Manokwari is one of the State Owned Enterprises (BUMN) in Manokwari, West Papua Province, as a provider of electricity. In order to support the company's main business objectives, PLN UP3 Manokwari has implemented Information Technology (IT) which is structurally managed and implemented by the Information Technology Division (ITD). However, information technology management at PLN UP3 Manokwari currently has not implemented information technology governance with a specific framework. To support the on going management of information technology, the Information Technology Division of PLN UP3 Manokwari still uses it tools in certain sections such as in the application development section using laravel framework with the development model use System Development Life Cycle (SDLC), then in section Cyber Security they are studying Perdue Model as a reference, while in some parts still use

the system manually. Management of data that is still manual has many risks, including systems that are not integrated, Overwhelmed in handling risks, maintenance of uncontrolled information technology assets, and other risks. This causes the company's main business objectives have not been achieved optimally. In addition, the obstacles faced in the information technology section are such as the Information Technology Division which was only formed in 2019 so that in the management of information technology at PLN UP3 they are still trying to make improvements, then there is no technician section available in the field so they have trouble when there is damage require technicians and a lack of Human Resources in the information technology section which causes them to be overwhelmed in handling information technology management at PLN UP3 Manokwari.

Based on the problems above, the researcher offers the design of information technology governance in the division information technology PT PLN UP3 Manokwari uses Frameworks COBIT 2019. COBIT 2019 was chosen as the framework to be used in this study because it is more flexible and has a wider scope. Data collection will be carried out using interview techniques with assistance toolkit COBIT 2019 and a questionnaire made based on the selected domain in the assessment factor designat COBIT 2019. The questionnaire will be distributed to PT PLN UP3 Manokwari parties who are directly responsible for a job, who are selected based on the RACI Chart. For the stages or phases that will be carried out follow the approach implementation roadmap COBIT 2019. Output of this research is in the form of an information technology governance plan that contains recommendations for improvements that can be used by the Division Information Technology at PLN UP3 Manokwari to support the achievement of the company's main business objectives.

2. RESEARCH METHOD

The methodology that will be used in this study is to adopt the approach implementation roadmap COBIT 2019 but not all phases are used because they are limited at the design stage. The phases used are phases 1-4 ie: what are the drivers?, where are we now?, where do we want to be?, And what needs to be done?

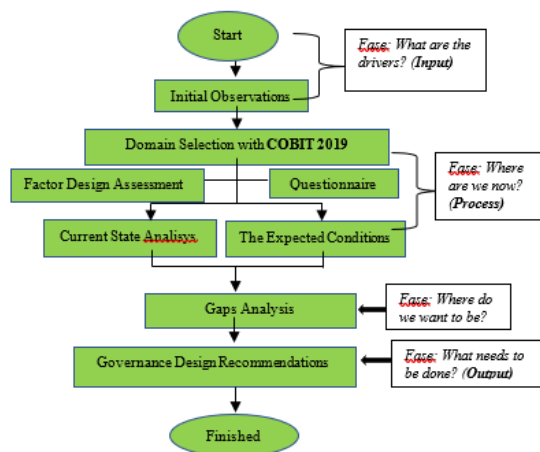


Figure 1. Research Method

The description of the Research Flow

Stage 1: What are the drivers?

This stage is carried out in two ways, namely: literature review which is carried out to dig up information related to the problems and objects studied such as the theoretical foundations and models of information technology governance, and business process studies which are carried out through interviews and company document studies to collect company data through company profiles which include company details, basic company information, company achievements and other information.

Stage 2 :Where are we now?

The steps used in stage 2 are: COBIT domain selection, data collection, and data analysis and processing. The selection of the COBIT domain was carried out through interviews with the Manager and IT Division of the PLN UP3 Manokwari, using questions that referred to the 10 design factors that had been provided by the 2019 COBIT toolkit, the results of selecting the COBIT domain based on the 2019 COBIT toolkit were discussed again with the PLN UP3 IT Manager and Division to get the final result of choosing the selected COBIT domain that is tailored to the needs of the company. Data collection was carried out through factor design assessments and questionnaires. The design factor assessment was carried out through interviews with the Manager and IT Division of PLN UP3 Manokwari. The questions given refer to the 10 factor designs contained in the COBIT 2019 toolkit. The results of the interviews are in the form of ordinal scales which are inputted into the toolkit and the data processing is processed directly by the tools provided in the COBIT 2019 framework. From the results of the factor design research it will be known the level of capability that expected by the company as well as the chosen cobit domain based on the highest level of capability. The questionnaire was prepared based on the selected domain in the 2019 COBIT framework. The questionnaire will be distributed to respondents who are parties to PLN UP3

Manokwari who are directly responsible for a job selected based on the RACI Chart. Questionnaire result data is processed to determine the company's current capability level using descriptive statistical techniques Analysis of questionnaire data processing is carried out by calculating scores on the assessment of each process where there is an achievement value per activity. The rating for details of achievement is the percentage of the average value of the total activity value per IT process formulated in the company [31].

$$\text{Ratings} = \frac{\text{total activity value per process}}{\text{number of respondents}} \times 100\% \quad (1)$$

From the average value, it is converted into a rating scale, including N, P, L, and F. N (not achieved) on a scale of 0 – 14%, in this category there is no or only little evidence of the achievement of information technology processes. P (partially achieved) scale of 15 – 50%, in this category there is some evidence regarding the achievement of information technology processes. L (largely achieved) scale of 50 – 84%, in this category there is evidence of a systematic approach, and significant achievement of certain processes, although there may still be insignificant weaknesses. F (fully achieved) scale of 85 – 100%, in this category there is systematic and complete evidence, and full achievement of the process attributes.

Stage 3 :Where do we want to be?

In the gap analysis process, a comparison will be made between the company's current capability level which has been obtained from the results of processing the questionnaire data with the capability level expected by the company obtained from the factor design assessment. From this comparison is used to analyze the extent to which the current IT process is in accordance with the conditions expected by PLN UP3 Manokwari.

Stage 4 :What needs to be done?

At this stage an improvement plan is made based on the gap analysis obtained in the previous stage. The improvement plan contains recommendations that can be used by the Information Technology Division of PT PLN UP3 Manokwari to achieve the level of implementation of Information Technology processes expected by the company. Furthermore, the drafting of Information Technology governance was carried out at the Information Technology Division of PT PLN UP3 Manokwari. The governance plan for each IT process is presented in tabular form which refers to the COBIT 2019 Governance and Management Objectives. The design of IT governance consists of six components, namely: IT processes, process objectives, key practices, key performance indicators, work results and maps of roles and responsibilities.

3. RESULT AND DISCUSSION

3.1 COBIT Domain Selection

The cobit domain selection was carried out through a factor design assessments for all

governance processes totaling 40 processes were carried out using toolkit COBIT 2019 which has been provided by ISACA 2019 [28] [32] [33] [34]. Based on the factor design assessment shown in table 1, then the selected cobit domain is every process marked in green.

Table 1. Target Capability Level per IT Governance Process

	Domain	Expected Level of Capability
EDM01	Ensured Governance Framework Setting and Maintenance	4
EDM02	Ensured Benefits Delivery	4
EDM03	Risk Optimization	4
EDM04	Ensured Resource Optimization	4
EDM05	Ensured Stakeholder Engagement	4
APO01	Managed IT Management Framework	4
APO02	Managed Strategy	4
APO03	Managed Enterprise Architecture	4
APO04	Managed Innovation	4
APO05	Managed Portfolio	4
APO06	Managed Budget and Costs	4
APO07	Managed Human Resources	4
APO08	Managed Relationship	4
APO09	Managed Service Agreements	3
APO010	Managed Vendors	4
APO011	Managed Quality	4
APO012	Managed Risk	4
APO013	Managed Security	4
APO014	Managed Data	4
BAI01	Managed Programs	4
BAI02	Managed Requirements Definition	4
BAI03	Managed Solutions Identification and Build	4
BAI04	Managed Availability and Capacity	4
BAI05	Managed Organizational Change	4
BAI06	Managed IT Changed	4
BAI07	Managed IT Change Acceptance and Transitioning	4
BAI08	Managed Knowledge	3
BAI09	Managed Assets	3
BAI010	Managed Configuration	4
BAI011	Managed Projects	4
DSS01	Managed Operations	4
DSS02	Managed Service Requests and Incidents	4
DSS03	Managed Problems	4
DSS04	Managed Continuity	4
DSS05	Managed Security Services	4
DSS06	Managed Business Process Controls	4
MEA01	Managed Performance and Conformance Monitoring	4

MEA02	Managed System of Internal Control	4
MEA03	Managed Compliance with External Requirements	4
MEA04	Managed Assurance	4

Out of a total of 40 information technology governance processes, the Information Technology Division of PLN UP3 Manokwari said that almost all information technology governance processes are important to the company, so that the level of capability expected in each high-value process can be seen in table 1. However, this study only took the information technology governance processes that were most prioritized by the company. From the results of the discussion, the selected COBIT domains were EDM03, APO03, APO12, APO13, BAI01, BAI03, BAI06, BAI06, BAI07, BAI11, DSS05. This is because the company still has difficulties in handling risks and the need for a managed enterprise architecture.

3.2 Results of Data Processing

The collected questionnaires were processed using descriptive statistical techniques according to the previous explanation. The results of processing the questionnaire data from the selected COBIT domains are shown in the following tables:

EDM03 Process Assessment (Risk Optimization Management). The capability level of the EDM03 process is still at level 1 with a rating scale of 36% or category P (partially achieved).

Table 2. Result of the EDM03 Process Assessment

Activity	Result
Activity 1	45%
Activity 2	37%
Activity 3	25%
Total	107%
Ratings	36%

APO03 Process Assessment (Managed Enterprise Architecture Management). The APO03 process has a capability level at level 2 with a rating scale of 67% or category L (largely achieved).

Table 3. Result of the APO03 Process Assessment

Activity	Result
Activity 1	67%
Activity 2	72%
Activity 3	59%
Activity 4	66%
Activity 5	69%
Total	332%
Ratings	67%

Assessment of APO12 Process (Managed Risk Management). The capability level of the APO12 process is still at level 1 with a rating scale of 45%

or category P (*partially achieved*).

Table 4. Result of the APO12 Process Assessment

Activity	Result
Activity 1	47%
Activity 2	33%
Activity 3	37%
Activity 4	45%
Activity 5	54%
Activity 6	53%
Total	269%
Ratings	45%

APO13 Process Assessment (Managed Security Management). The APO13 process capability level is still in place at level 1 with a rating scale of 39% or category P (*partially achieved*).

Table 5. Result of the APO13 Process Assessment

Activity	Result
Activity 1	37%
Activity 2	42%
Activity 3	39%
Total	118%
Ratings	39%

BAI01 Process Assessment (Managed Program Management). The BAI01 process has a capability level at level 2 with a rating scale of 70% or category L (*largely achieved*).

Table 6. BAI01 Process Assessment Result

Activity	Result
Activity 1	77%
Activity 2	62%
Activity 3	65%
Activity 4	79%
Activity 5	70%
Activity 6	72%
Activity 7	64%
Activity 8	70%
Activity 9	68%
Total	627%
Ratings	70%

Process Assessment BAI03 (Management of Managed Solution Identification and Manufacturing). The BAI03 process has a capability level at level 2 with a rating scale of 67% or category L (*largely achieved*).

Table 7. BAI03 Process Assessment Result

Activity	Result
Activity 1	72%
Activity 2	66%
Activity 3	69%
Activity 4	70%
Activity 5	65%
Activity 6	76%
Activity 7	63%
Activity 8	71%
Activity 9	64%
Activity 10	65%
Activity 11	60%

Activity 12	67%
Total	808%
Ratings	67%

BAI06 Process Assessment (Managed IT Change Management). The BAI06 process has a capability level at level 2 with a rating scale of 73% or category L (*largely achieved*).

Table 8. BAI06 Process Assessment Result

Activity	Result
Activity 1	75%
Activity 2	74%
Activity 3	67%
Activity 4	76%
Total	292%
Ratings	73%

Process Assessment BAI07 (Managed IT Change Acceptance and Transition Management). The BAI07 process has a capability level at level 2 with a rating scale of 71% or category L (*largely achieved*).

Table 9. BAI07 Process Assessment Result

Activity	Result
Activity 1	77%
Activity 2	72%
Activity 3	65%
Activity 4	72%
Activity 5	67%
Activity 6	63%
Activity 7	76%
Activity 8	78%
Total	570%
Ratings	71%

BAI11 Process Assessment (Managed Project Management). The BAI11 process has a capability level at level 3 with a rating scale of 74% or category L (*largely achieved*).

Table 10. BAI11 Process Assessment Result

Activity	Result
Activity 1	69%
Activity 2	75%
Activity 3	75%
Activity 4	79%
Activity 5	77%
Activity 6	66%
Activity 7	72%
Activity 8	78%
Activity 9	76%
Total	667%
Ratings	74%

DSS05 Process Assessment (Managed Service Management). The capability level of the DSS05 process is still at level 1 with a rating scale of 39% or the P category (*partially achieved*).

Table 11. DSS05 Process Assessment Result

Activity	Result
Activity 1	49%
Activity 2	35%
Activity 3	45%
Activity 4	29%
Activity 5	37%

Activity 6	36%
Activity 7	42%
Total	273%
Ratings	39%

3.3 Gap Analysis Results

The results of the gap analysis between the current level of IT process capability and the level of capability expected by the IT Division of PT PLN UP3 Manokwari are shown in table 12.

Table 12. Gaps Analysis

No.	Domain	Current Level of Capability	Expected Level of Capability	Gaps
1	EDM01	1	4	3
2	APO03	2	4	2
3	APO12	1	4	3
4	APO13	1	4	3
5	BAI01	2	4	2
6	BAI03	2	4	2
7	BAI06	2	4	2
8	BAI07	2	4	2
9	BAI11	2	4	2
10	DSS05	1	4	3

3.4 Recommendations for Improvement

Based on the results of the assessment of each IT governance process in the IT Division of PT PLN UP3 Manokwari, in order to achieve the expected level of capability, it is recommended that companies take corrective actions in IT management of each selected process domain with reference to the IT governance design that has been designed by researchers. The IT governance model was created by considering the current implementation of IT in the IT Division of PT PLN UP3 Manokwari. Based on the indicators of the company's goals, it is necessary to have policies in managing IT processes so that they can support the achievement of the company's main business goals. This IT governance design recommendation is prepared based on the governance design referring to COBIT 2019 Governance and Management Objectives (ISACA, 2019).

In the data processing results table above, each process on average is still at level 2 in the L rating, while the level expected by the company is all at level 4, to be able to achieve the expected capability level as determined based on the results of the design factor measurement, then each process needs to be upgraded to level 4 with an F rating. several steps are recommended for companies to reach level 4, namely: Setting quantitative goals related to the process, allocating quantitative goals for processes and their sub-processes, managing the performance of one/more sub-processes -process statistically from the defined process which is an important contributor to the overall performance of the process, predicts the ability of the process to achieve the set quantitative objectives taking into account the performance of the managed sub-processes and incorporates the selected process

performance measurements into the process performance baseline (rindi, 2022).

3.5 Design of Information Technology

The IT management model is realized in the form of an information technology governance design based on the ISACA guidelines (2019), which was compiled as a guideline for the IT Division of PT PLN UP3 Manokwari in managing IT. This design is structured for the entire selected COBIT domain process, namely: Risk Optimization Management (EDM03), Managed Enterprise Architecture Management (APO03), Managed Risk Management (APO12), Managed Security Management (APO13), Managed Program Management (BAI01), Managed Solution Identification and Development Management (BAI03), Managed IT Change Management (BAI06), Managed IT Change Acceptance and Transition Management (BAI07), Managed Project Management (BAI11), and Managed Security Services Management (DSS05).

The design of IT governance is designed based on the 2019 COBIT framework. The scale of each indicator is in the form of percent, where each indicator is expected to achieve an F (fully achieved) rating scale, namely a scale of 85 – 100% and the maximum target is 100% meaning that in this category the company already has evidence systematic, complete, and full achievement of the process attributes.

4. CONCLUSION

The conclusion from the results of research on the Information Technology Division of PT PLN UP3 Manokwari is that the IT division of PLN UP3 Manokwari has not been maximized in IT process management, this can be seen in the level of IT process capability in the average IT division which is still at level 2, while the level of capability that is expected by the company based on factor design assessors, from the selected cobit domains namely: EDM03, APO03, APO12, APO13, BAI01, BAI03, BAI06, BAI07, BAI11, and DSS05 are all at level 4, to be able to achieve the expected level of capability, companies are recommended steps that can be taken to reach level 4. Taking into account the current implementation of IT in the IT Division of PLN UP3 Manokwari, as well as indicators of company objectives, policies are needed in managing IT processes, therefore researchers create governance plans for the entire selected Cobit domain process which was compiled referring to the COBIT 2019 Governance and Management Objectives. IT management is realized in the form of an IT governance plan which is prepared as a guideline for the PLN UP3 Manokwari IT Division in managing the company's IT.

Based on the research results, suggestions that can be given are: first, suggestions for the IT division of PLN UP3 Manokwari are suggested to apply IT designs made by researchers to improve IT

management in companies, second, suggestions for future researchers are advised to continue this research by taking cobit domains that have not been made by researchers and being able to audit information technology governance at PLN UP3 Manokwari.

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