



## Information Technology Governance Awareness: A Proposed Formula for Assessment

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### Abstract

*This article aims to provide a proposed formula that can be used to measure the level of success in the practice of Information Technology Governance. To obtain this formulation, in-depth surveys and interviews involving several experts are needed. The calculation results show that organization G has an awareness value of 93 (good) with a maturity value of 3.13. On the other hand, organization E has an awareness value of 70 (medium) with a maturity value of 2.60. This proposed formula can be used as an alternative way to determine the level of success of an organization in the practice of Information Technology Governance by knowing the level of awareness. So far, to determine the level of success in implementing IT Governance practices in an organization, the method used is to calculate the maturity level that refers to COBIT best practices, which only focus on objects but do not focus on subjects (stakeholders) in the organization.*

*Keywords: information technology, governance, awareness, formula, assessment*

### 1. Introduction

Information Technology (IT) has now become an essential requirement in almost all companies or organizations. This is believed because IT can help improve effectiveness and efficiency in business processes [1]–[5]. To increase the effectiveness and efficiency, it is necessary to optimize the information obtained from IT, so that business processes will get many benefits [6]–[7], opportunities, and gain competitive advantage [8]. In order for this to be achieved, excellent and correct management is needed so that IT involvement is able to support the organization to achieve its goals [9]–[11]. Therefore, in order for IT to be managed properly and correctly, organizations need to understand IT Governance. It is also emphasized that organizations that do not understand and do not comply with the rules can affect the existence of their organization [12].

Good IT Governance can provide significant benefits for an organization, for example, it can reduce risk, return on investment, and can achieve business goals, namely: can provide added value or great benefits for the organization [13]–[14]. However, not all organizations can manage IT Governance properly, this is caused by obstacles or challenges in its implementation. The implementation of IT Governance

usually requires a large investment of funds, if not controlled and supervised properly it can have a negative impact on the survival of an organization [15]–[16]. Therefore, strict supervision and control are necessary. In addition to investment funds, commitment and support from top management are important, the lack of enforcement of the rules and the lack of commitment from the leadership to consistently apply the procedures or rules that have been made can hinder its implementation [17]–[20]. Lack of commitment and understanding from the leadership, perhaps due to a lack of awareness understanding the importance of IT Governance which can have a major impact on successful implementation [21]–[23]. In addition, the lack of a good understanding of the importance of IT Governance is also a factor that can greatly influence the success of the practice [6], [7], [24]. The implementation of IT Governance will not be successful if it does not get optimal support from top management so that the implementation is only half-assed and as a result, the results are less than optimal. The implementation of IT Governance, of course, will bring many changes, namely: changes in habits that have been applicable in an organization. Changes that can change habits are unprecedented, so they can raise concerns about the ability and skills to carry them out. Another thing that is no less important related to the challenges

in the practice of IT Governance is the involvement of stakeholders [25]–[27]. It is very unlikely that the implementation of IT Governance can be successful if it does not involve and invite all components in an organization, namely: all parties involved without exception. They are an integral part that works synergistically and influence each other because between parts work together and support each other so that if one or part of them does not involve one or more of them it is certain that the implementation of IT Governance cannot run as expected.

Until now, it is very rare to find research that discusses awareness related to the field of IT Governance in an organization, especially those that focus on IT Governance practices, especially on how it is measured. Many studies on awareness have been found, but many focusing on security awareness have been carried out [28]–[29]. A study that really discusses IT Governance awareness has been carried out, namely: to find out IT Governance awareness and practice from the perspective of senior managers in Malaysian organizations, the results show that there is a positive correlation between IT Governance awareness and implementation, namely: awareness increasing impact on improving IT Governance [30]–[32]. The positive correlation between awareness of IT Governance and implementation of IT Governance is consistent with the concept of thinking, namely: awareness of IT Governance is in line with successful implementation in an organization [33]. This study uses 5 domains (focus areas) on IT Governance and uses 3 levels of perspective from the respondents (perception, understanding, and projection), but has not conducted an examination and assessment of the level of awareness of IT governance practices. Other research that discusses how awareness becomes an important factor in determining the success of the implementation and acceptance of Governance has been carried out. Important success factors used in this study are based on and consider benefits, risk reduction, opportunities, and barriers [34]. In addition, have conducted research on determining important areas in IT Governance awareness, but this is only a model.

So far, to determine the level of success in implementing IT Governance practices in an organization, the method used is to calculate the maturity level which refers to COBIT best practices [4] - [13], which only focuses on objects but does not focus on subjects (stakeholders) in the organization. Whereas the parties involved have a very significant influence in determining the success rate of implementing IT Governance practices, especially in awareness.

Seeing these conditions, research on IT Governance awareness, especially focusing on how to measure IT Governance awareness has not been carried out, especially with regard to the level of awareness

assessment that has been submitted by previous researchers, this is a significant contribution in this research which is a new finding that has never been done before. exist and have never been done by previous researchers.

Determining the level of consciousness is not easy, therefore this is an important opportunity for research. This study aims to provide a proposed formula that can be used to measure the level of success in the practice of Information Technology Governance by focusing on awareness. It is hoped that the research results can be useful for stakeholders to determine the level of success of the implementation of IT governance practices so that they can be used for continuous improvement related to their implementation in order to achieve success in accordance with organizational goals.

## 2. Research Methods

The research method in this research has 4 stages as shown in Figure 1. The first stage starts with a literature study to obtain important areas that can affect awareness in the implementation of IT Governance, followed by the next stage of opinion or expert opinion, at this stage aims to confirm and highlight important areas. The next stage is the Group Discussion Forum, where at this stage the experts discuss important areas. Experts hold discussions together to determine and reach an agreement on important areas of awareness that have an influence on the implementation of IT Governance. The last stage in the research designing assessments and grouping categories. So, the research consists of several stages to get the final result.

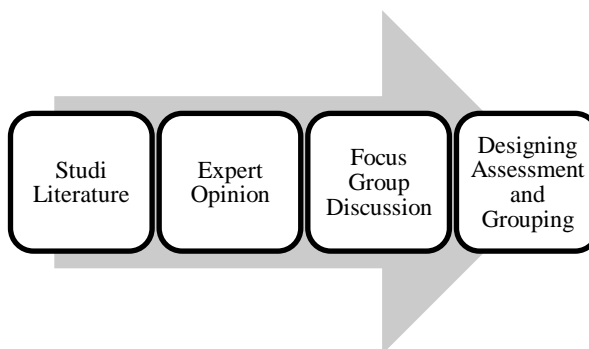


Figure 1. Stages to get data and complete research

### 2.1. Study Literature

Based on the research questions that have been made, proceed with conducting a literature review through reference books and previous research related to the research conducted. By using the method of summarizing, comparing, criticizing, differentiating, and synthesizing from previous research, a framework is generated. Due to the limitations and lack of research related to the field of IT Governance awareness, a literature search process was carried out using

keywords that were close to the topic of discussion. After obtaining the desired literature, then proceed with the selection process and literature selection carried out using the PRISMA (Preferred Reporting Items for Systematic Review and Meta-analysis) method. The PRISMA method was used because the steps were complete and detailed to conduct a literature review [7]. A literature review to find out areas related to IT Governance awareness was carried out from October 2021 to April 2022. A literature review with several books on IT Governance and coupled with best practice guidelines, was used as a guide to determine the direction of research carried out so that it remains relevant. focus and facilitate the implementation of this research. The literature review is taken from several libraries or books related to the topic of discussion in this research, as well as best practices. The best practice used refers to a framework that has been standardized internationally, namely: ISO/IEC 38500 and COBIT.

### 2.2. Expert Opinion

Because the topic of discussion in research is something that has never been studied by previous researchers, opinions from experts are needed to obtain information that has not been obtained from the previous stage. The experts consist of several academics or practitioners totaling 20 people, drawn from organizations in Indonesia with the requirements to have credibility in the IT Governance field as shown by a minimum of 10 years experience and a magister's education but preferably a doctor's with a good understanding of the field, especially IT Governance. Information is obtained through interviews or interviews that can be done several times to really get complete and detailed information.

### 2.3. Focus Group Discussion

Focus Group Discussions were held with the aim of getting the results of thoughts and mutual agreement from the experts on the topic of discussion given to them. Experts consist of several academics or practitioners totaling 6 experts, drawn from various organizations with the requirements to have credibility in the IT Governance field as shown by a minimum of 10 years experience and bachelor's education but preferably a magister with a good understanding of the field, especially IT Governance.

### 2.4. Designing Assessment and Grouping

The most important thing to do at this stage is to make a formula that is used to process the data obtained through surveys in the field. This formula was created taking into account the weights on the important areas and the dimensions on consciousness. The accumulation of values from important fields and dimensions of awareness becomes the final value of an awareness value in an organization which is then grouped by category. Determining the weights on important areas and dimensions on awareness, as well as categories requires several references and involves several competent experts both in the field of IT Governance and in the field of psychology.

## 3. Results and Discussions

After conducting discussions involving several experts in the field of IT Governance, it was concluded that the level was given a weight of 40% and at the level it was given a weight of 35% and for level III it was given a weight of 25%. After getting the weighting value of each dimension and area, the next step is to create a scoring system.

By considering the value of weights (dimensions and areas) as well as the number of development descriptions on each dimension (knowledge, attitudes, and behavior) which is the basis for making a scoring system. Details about this can be seen in Table 1.

The design of the assessment was made based on the accumulation of the number of questions from the area and the sum of all each dimension of agreement namely, knowledge, attitude, and behavior. In Table 2 there are 10 areas with a total of 31 questions. If the dimensions consist of 3, namely: knowledge, attitudes, and behavior, then the total number of questions will be 93 pieces.

Using the basis of Table 2, it is developed into a formula for calculating the result to determine IT Governance Awareness. The complete formula can be seen in Table 2.

*Code description:*

V: Value	SH: Stakeholder
K: Knowledge	PC: Policy
A: Attitude	BS: Business Strategy
B: Behavior	OG: Organization
Aw: Awareness	CM: Commitment
RM: Risk Management	CP: Competence
RS: Resources	CC: Communication
BG: Budget	

Table 1. Scoring System

Area	Knowledge (20%)	Attitude (30%)	Behavior (50%)
Risk Management (40%)	3	3	3
Resources (25%)	3	3	3
Budget (35%)	2	2	2
Stakeholder Engagement (35)	3	3	3
Policy (25%)	4	4	4
Business Strategy (25%)	4	4	4
Organization (35%)	5	5	5

Commitment (35%)	3	3	3
Competence (25%)	2	2	2
Communication (25%)	2	2	2

Table 2. Formula for Calculation of Consciousness Value

Area	Knowledge (20%) VK	Attitude (30%) VA	Behavior (50%) VB	Amount
Risk Management (RM) (40%)	$VKRM/15*0,2$ $= 0,4*{(VKRM/15*0,2)} + {(VARM/15*0,3)} + {(VBRM/15*0,5)}$	$VARM/15*0,3$	$VBRM/15*0,5$	VAw RM
Resources (RS) (25%)	$VKRS/15*0,2$ $= 0,25*{(VKRS/15*0,2)} + {(VARS/15*0,3)} + {(VBRs/15*0,5)}$	$VARS/15*0,3$	$VBRs/15*0,5$	VAw RS
Budget (BG) (35%)	$VKBG/10*0,2$ $= 0,35*{(VKBG/10*0,2)} + {(VABG/10*0,3)} + {(VBBG/10*0,5)}$	$VABG/10*0,3$	$VBBG/10*0,5$	VAw BG
Stakeholder (SH) (35%)	$VKSH/15*0,2$ $= 0,35*{(VKSH/15*0,2)} + {(VASH/15*0,3)} + {(VBSH/15*0,5)}$	$VASH/15*0,3$	$VBSH/15*0,5$	VAw SH
Policy (PC) (25%)	$VKPC/20*0,2$ $= 0,25*{(VKPC/20*0,2)} + {(VAPC/20*0,3)} + {(VBPC/20*0,5)}$	$VAPC/20*0,3$	$VBPC/20*0,5$	VAw PC
Business Strategy (BS) (25%)	$VKBS/20*0,2$ $= 0,25*{(VKBS/20*0,2)} + {(VABS/20*0,3)} + {(VBBS/20*0,5)}$	$VABS/20*0,3$	$VBBS/20*0,5$	VAwBS
Organization (OG) (35%)	$VKOG/25*0,2$ $= 0,35*{(VKOG/25*0,2)} + {(VAOG/25*0,3)} + {(VBOG/25*0,5)}$	$VAOG/25*0,3$	$VBOG/25*0,5$	VAw OG
Commitment (CM) (35%)	$VKCM/15*0,2$ $= 0,35*{(VKCM/15*0,2)} + {(VACM/15*0,3)} + {(VBCM/15*0,5)}$	$VACM/15*0,3$	$VBCM/15*0,5$	VAw CM
Competence (CP) (25%)	$VKCP/10*0,2$ $= 0,25*{(VKCP/10*0,2)} + {(VACP/10*0,3)} + {(VBPC/10*0,5)}$	$VACP/10*0,3$	$VBPC/10*0,5$	VAw CP
Communication (CC) (25%)	$VKCC/10*0,2$ $= 0,25*{(VKCC/10*0,2)} + {(VACC/10*0,3)} + {(VBCC/10*0,5)}$	$VACC/10*0,3$	$VBCC/10*0,5$	VAw CC

The explanation of the formula according to Table 3, for example by taking an example in the risk management area according to the table is formulated as follows:

$$VAwRM = 0,4*{(VKRM/15*0,2)} + {(VARM/15*0,3)} + {(VBRM/15*0,5)} \quad (1)$$

$$VAw = VAwRM + VAwRS + VAwBG + VAwSH + VAwPC + VAwBS + VAwOG + VAwCM + VAwCP + VAwCC \quad (2)$$

Formula description:

- (1) 0,4 here states the weight (40%) of the Risk Management area (see Table 3)
- (2) VKRM is risk management knowledge value
- (3) 15 is the total score because here the number of questions in the risk management area is 3 and if it is correct, it gets 5 points so if answered correctly all  $3 \times 5 = 15$
- (4) 0,2 is the weighted value (20%) on the knowledge dimension
- (5) VARM is the value of risk management attitude
- (6) 15 is the total score because here the number of questions in the risk management area is 3 and if it is correct, it gets 5 points so if answered correctly all  $3 \times 5 = 15$
- (7) 0.3 is the weighted value (30%) on the attitude dimension
- (8) VBRM is the value of risk management behavior (10) 15 is the total score because here the number of questions in the risk management area is 3 and if it is correct, it gets 5 points so if answered correctly all  $3 \times 5 = 15$
- (9) 50 is the weighted value (50%) on the behavioral dimension.

(10) VAwRM is the awareness value in the risk management area and VAw is the overall awareness value.

The answer key was created with the aim of determining the final<sup>(1)</sup> score of the results of the IT Governance awareness assessment. By knowing the result, it can be seen the extent of the level of consciousness. This answer key is divided into 3 parts for knowledge and attitudes, namely right, wrong and don't know. True has a weight value of 5, false with a weight of 0 while not knowing has a weight of 2. There is confusion in determining the weight of the answer I don't know but based on the consideration of input from several experts, finally the answer is not given a weight of 2. As for the assessment of behavior there are 2 parts, namely yes or no. Yes, here means that the party being assessed takes real action from what is being asked according to the assessment model that has been made. At least the party being assessed gives an honest answer and can provide evidence or examples in the form of the action taken, while the answer is no, if indeed the party being assessed does not act. From all the results of the answers then calculated mathematically in accordance with the provisions of the calculation (formula) that has been designed, so that the result will be obtained. Where the result value is then seen to belong to which group (good, moderate, or less). The basis for this grouping also refers to previous research that made an assessment model of awareness from all the answers then calculated mathematically in accordance with the provisions of the calculation (formula) that has been designed, so that the result will be obtained. Where the result value is then seen to belong to which group (good, moderate, or less). The basis for this grouping also refers to previous

research that made an assessment model of awareness from all the results of the answers then calculated mathematically in accordance with the provisions of the calculation (formula) that has been designed, so that the result will be obtained. Where the result value is then seen to belong to which group (good, moderate, or less). The basis for this grouping also refers to previous research that made an assessment model of awareness (Bitton et al., 2017; Hennie A Kruger, 2006) namely: good (80-100); moderate (60-79) and less (59>=). The grouping of awareness values can be seen in Table 3.

Table 3. Grouping of Awareness Values

Value of Consciousness	Category
80-100	Good
60-79	Moderate
59 >=	Poor

To obtain data on an IT Governance awareness assessment from an organization, a survey was conducted through observation and interviews, in order to obtain data. The data that has been obtained is then processed to get the final value or the value of awareness (NK), where the final value determines the category in a grouping (good, moderate or less).

In the process of collecting data through surveys it must be done objectively and not subjectively. To avoid subjectivity in conducting an assessment, the appraiser must carry out activities in accordance with established business processes or procedures. The appraiser in carrying out all forms of assessment activities must be well documented so that later it can be confirmed again if needed. Creating a conducive atmosphere and interactive communication is very important so that the relationship of openness can be established so that it can dig up more complete and in-depth information or information. while Table 4 displays the results in the assessment and grouping of IT Governance awareness.

Table 4. Assessment Result Form and Grouping

Area	Knowledge (20%)	Attitude (30%)	Behavior (50%)	Amount
Risk Management (40%)	xxxxx	xxxxx	xxxxx	xxxxx
Resources (25%)	xxxxx	xxxxx	xxxxx	xxxxx
Budget (35%)	xxxxx	xxxxx	xxxxx	xxxxx
Stakeholder Engagement (35%)	xxxxx	xxxxx	xxxxx	xxxxx
Policy (25%)	xxxxx	xxxxx	xxxxx	xxxxx
Business Strategy (25%)	xxxxx	xxxxx	xxxxx	xxxxx
Organization (35%)	xxxxx	xxxxx	xxxxx	xxxxx
Commitment (35%)	xxxxx	xxxxx	xxxxx	xxxxx
Competence (25%)	xxxxx	xxxxx	xxxxx	xxxxx
Communication (25%)	xxxxx	xxxxx	xxxxx	xxxxx

Awareness Value: xx, xx  
 Category: Good/ Moderate/ Poor

In this trial of the IT Governance awareness assessment model that has been created, we took 10 samples from an organization, both in government agencies, education, and companies. Samples were taken at random, and observations were made in several ways, including online forms, surveys, and confirmations. In total there are 93 questions consisting of 31 questions about knowledge, 31 questions related to attitudes and 31 questions about behavior. The list of questions can be seen in the attachment to this research report. After getting data from several organizations, in this case 10 organizations with details of 4 in government, 5 in education and 1 in the company/private sector. Data that has been obtained in the period August to September 2021, then the data is processed using ordinary statistical software (MS. Excel). The data that has been obtained can be seen in Table 5.

Table 5. Processed Results of Awareness Value Survey Data

No.	Organization	Knowledge 20%	Attitude 30%	Behavior 50%	Value Awareness	Category	Value Maturity
1	A	155	150	115	85	Good	2,77
2	B	152	150	135	92	Good	3,10
3	C	141	155	120	84	Good	2,93
4	D	150	145	135	90	Good	3,13
5	E	101	111	120	70	Moderate	2,60
6	F	152	152	115	83	Good	2,77
7	G	138	143	145	93	Good	3,13
8	H	117	145	135	84	Good	2,70
9	I	152	152	95	79	Moderate	2,50
10	J	131	136	130	84	Good	2,70

Figure 1 is the processed data using the statistical software previously mentioned, it appears that the results of the assessment of the level of awareness of IT Governance in organizations that have been surveyed

have an average value of 84.31. This shows that the level of awareness of IT Governance in the average organization is good, but there are some organizations that are still below average

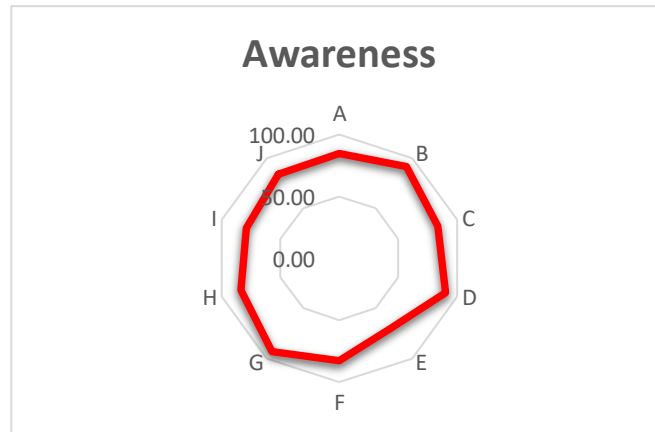


Figure 2. Graph of IT Governance Awareness Level Assessment Results

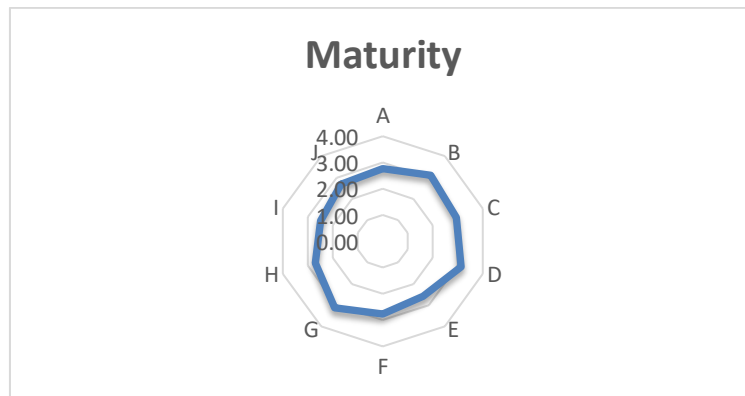


Figure 2. Graph of IT Governance Maturity Level

Table 6. Processed Results of Maturity Value Survey Data

Respondent	Position	Organization	Confirmation Amount	Maturity Value
R01	Researcher	A	3	2.77
R02	Senior Manager	B	2	3.10
R03	Researcher	C	3	2.93
R04	The first expert computer system	D	2	3.13
R05	ICT Operations	E	1	2.60
R06	Head of Information Systems Study Program	F	3	2.77
R07	Senior Manager Head of Informatics	G	2	3.13
R08	Engineering Study Program	H	2	2.70
R09	Lecturer of Informatics	I	2	2.50
R10	Senior Manager	J	2	2.70

Table 6 shows that the maturity value of IT Governance from several organizations has an average value of 2.83. This data is obtained from the results of each organization's answers through surveys and

observations. This maturity value is needed in relation to being used as reference material and reference from the results of the IT Governance awareness assessment. Furthermore, we process the results of this data to be processed in the form of a graph, so that it is easy to analyze it.

From the results of the survey data processing, which can be seen in Figure 5 in the form of a graph, the graph form between the results of the level of awareness assessment has a shape that is almost the same as the graph of the maturity level. This shows that the results of the assessment of the level of consciousness do not contradict the value of the maturity level used as a reference. It should be noted that so far, the maturity level has been used as a parameter to determine the extent to which the implementation of IT Governance has been implemented. If an organization has a high level of maturity value, then the implementation of IT Governance will be able to achieve a success, and vice versa if the value of the maturity level is low, then the implementation of IT Governance in the organization will be able to experience a failure.

With these findings, that the value of the level of awareness does not contradict the value of the level of maturity, it proves that the assessment model that has been made can be used as an alternative that focuses on assessing the level of awareness that can be used to

determine the condition of an organization related to the implementation of IT Governance. These results are used as validation that the assessment model that has been made is feasible to be accepted as an assessment model that can be used and is useful for knowing the level of awareness in relation to the implementation of IT Governance. If all parties involved (stakeholders) have a high level of awareness, it can be predicted that the implementation of IT Governance implementation can achieve success, on the contrary if they have a low level of awareness.

#### 4. Conclusion

This research has succeeded in producing a formula to calculate the IT Governance Awareness assessment system. In the assessment and grouping requires high accuracy, especially in processing the data that has been obtained, this accuracy is related to mathematical calculations according to the formula that has been generated so that later the results obtained do not experience errors. In addition, what is even more important is the data collection process. The data were obtained through surveys and observations of the organizations that were the object of the assessment. Data collection must be carried out objectively and transparently by digging up information and documenting it in an orderly and good manner, so that if needed it can be reopened. The assessment is conducted openly (fair play) and creates a conducive atmosphere and interactive communication so that trust between the two parties can be well maintained. The results of this study indicate that organization G has an awareness value of 93 (good) with a maturity value of 3.13, while organization E has an awareness value of 70 (moderate) with a maturity value of 2.60. Further research can be done by collaborating this model with artificial intelligence. This research has limitations, namely, the output is only the result of calculations and grouping but has not been able to inform or indicate the shortcomings of the parts that must be corrected by the organization in implementing IT Governance practices, in the future this research can be developed.

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