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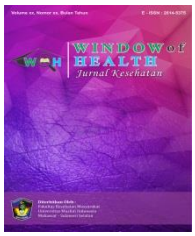

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Evaluation of User Satisfaction of Electronic Medical Record System at RSI Sultan Agung Semarang

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ABSTRACT

From 2019 to 2022, RSI Sultan Agung Semarang managed SIMRS independently. While the implementation remained hybrid, SIMRS was turned over to a third party in early 2023 to develop Electronic Medical Records (EMR). However, in 2024, a year later, the management of SIMRS and EMR was once again independent. It was necessary to assess user satisfaction with the EMR in light of these modifications. This study aims to determine the variables affecting users' satisfaction with the EMR at RSI Sultan Agung Semarang's medical record installation. Cross-sectional research was used in conjunction with quantitative research design. Questionnaires were distributed to collect data. Purposive sampling was used in the sampling process, and 32 individuals met the inclusion criteria. The statistical test results demonstrate that all of the variable's content, accuracy, format, ease of use, and timeliness have p-values less than 0.05, indicating a significant relationship between each variable and satisfaction with the EMR. Everything about the EMR system has been going smoothly; more system development is needed to make it easier to access quickly and effectively, which will improve the timeliness of medical services. Future research should look into other variables or perform long-term studies to track changes in user satisfaction.

Keywords : SIMRS; user satisfaction; health information system; health records

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INTRODUCTION

Medical records record a patient's medical history, diagnosis, treatment, and interaction with health workers. Medical record development has undergone various transformations, along with technological advances and changing needs in health services. The development of medical records aims to improve efficiency, accuracy, accessibility, and safety in health services. One of the global trends in healthcare is the application of information technology (IT) in the form of electronic medical records. [1] Electronic medical records (EMRs) are patient health records designed and implemented using these electronic systems. The application of Electronic medical records covers the period from when the patient is admitted until the patient is discharged, referred, or dies. [2]

Electronically generated medical documents are known as Electronic Medical Records (RME) and serve as an electronic repository of information that includes a patient's medical history and medical services received throughout their life. Electronic medical records offer prospective and retrospective data to support integrated, effective, sustainable, and quality healthcare. In healthcare settings, electronic medical records enhance patient satisfaction and documentation accuracy, accelerate data retrieval, and reduce clinical errors. [3] In 2022, the Indonesian Hospital Association (PERSI) collected data on the use of electronic medical record systems, and it was found that only 50% of the 3,000 hospitals in Indonesia had adopted electronic medical records. [4] As stated in the Minister of Health Regulation (PMK) Number 24 Year 2022 regarding Medical Records, numerous hospitals must implement electronic medical record systems, where recording patient medical history is now directed to a digital platform. Health Service Facilities are required by this policy to keep patient medical histories on electronic systems. Such a transition process is anticipated to be finished by December 31, 2023. The regulation is the legal basis to support the implementation of health technology transformation as part of the 6th pillar of Health Transformation. It is an update of PMK regulation number 269 of 2008 that has been adjusted to the development of science and technology, as well as service needs, policies, and laws in the community.

Sultan Agung Islamic Hospital Semarang independently operated SIMRS from 2019 to 2022. Following a change in hospital management, it shifted in 2023 to utilizing a third party to develop its Electronic Medical Records. However, the implementation is still hybrid and limited to SOAP recording, so other medical record forms are still paper. The latest change in hospital management in 2024 made the development of Electronic Medical Records at the Sultan Agung Islamic Hospital Semarang again managed independently without a third party since June 1, 2024. Changes that occur significantly can potentially affect user satisfaction, especially medical and administrative personnel who interact directly with RME at RSI Sultan Agung. Using RME managed by a third party presents new challenges for users, such as adjustments to the new system and work procedures. This uncertainty can trigger user dissatisfaction if the system implementation does not match the expectations of operational needs in the field. So far, there has been no measurement of user satisfaction with RME at RSI Sultan Agung, so monitoring and evaluating user satisfaction is necessary.

One way to assess how well a system has run is through the End User Computing Satisfaction (EUCS) approach. The evaluation model created by Doll & Torkzadeh emphasizes user satisfaction regarding information systems, including technological aspects and other factors that affect satisfaction. The factors considered include content, accuracy, format, user-friendliness, and timeliness. [5]

METHOD

Cross-sectional analysis was used in the research design to find relationships between variables simultaneously. The research site was the Sultan Agung Islamic Hospital in Semarang's Medical Record Installation. All staff who input and access medical record data at Sultan Agung Islamic Hospital Semarang's Medical Record Installation were included in the study's population. Purposive sampling was used to select the sample, and the 32 (Medical Recorder and Health Information) officers who met the inclusion criteria were those who had received training on SIMRS or electronic medical records, had access rights, and entered patient data into the system in the Medical Record Installation of RSI Sultan Agung Semarang.

RSI Sultan Agung Semarang Medical Record Installation medical record officers were given questionnaires to complete to collect primary data. The measurement scale utilized in the questionnaire was a Likert scale, ranging from very positive to very negative. The answer choices were strongly agree, agree, disagree, and disagree strongly. Each response option has a different score: strongly disagree receives a score of 1, disagree gets a score of 2, agree receives a score of 3, and strongly disagree gets a score of 4. Before data collection, ethical review number 82/KEPK RSISA/V/2024 was passed at RSI Sultan Agung Semarang. Distributing questionnaires and evaluating their validity and reliability serve as the research instrument. The correlation between each variable's score and the overall score is used to test the validity of the data. SPSS 25 was the software used for data analysis in this study. Univariate analysis was used to determine the properties of each variable under investigation. The frequency analysis of the independent and dependent variables will be used to display the study results for each variable. Furthermore, the association between the two variables was examined through bivariate analysis, utilizing the Chi-Square Test and 95% Confidence Interval at the significance level (α) = 0.05.

RESULTS

Thirty-two medical record officers from the RSI Sultan Agung Semarang Medical Record Installation were involved in this research. Table 1 shows the sociodemographic distribution of the participants, which is shown in the results section:

Table 1. Distribution of Respondent Characteristics by Frequency

Characteristics	Frequency	Percentage (%)
Age		
≤ 25 years old	2	6,3
26 - 33 years old	19	59,4
34 - 41 years old	11	34,4
Gender		
Male	10	31,3
Female	22	68,8

Characteristics	Frequency	Percentage (%)
Education Level		
DIII/DIV	31	96,9
S1	1	3,1
Length of Service		
> 15 years	5	15,6
1 - 5 years	6	18,8
10 - 15 years	4	12,5
6 - 10 years	17	53,1
Length of time using SIMRS		
< 1 year	3	9,4
> 3 years	15	46,9
1 - 3 years	14	43,8

Gender distribution showed that 68.8% of participants were female, while 31.3% were male. Based on educational background, 96.9% of respondents graduated from DIII/DIV, and the remaining 3.1% had S1 education. The age of most respondents was in the age range of 26-33 years (59.4%), while the lowest age range was ≤ 25 years (6.3%). Most respondents had 6-10 years of work experience (53.1%). Respondents with more than 10-15 years of work experience showed a smaller distribution (12.5%), indicating that most respondents were in the middle category of work experience, which could have a particular influence on their perception and satisfaction in using SIMRS at RSI Sultan Agung Semarang.

The majority of SIMRS users have experience using the system for more than 3 years (46.9%), followed by users who have used the system for 1 to 3 years (43.8%), and only a few who have used SIMRS for less than 1 year (9.4%). It indicates that most respondents have a good understanding of the system, which can affect their satisfaction with SIMRS at RSI Sultan Agung Semarang. This study used Chi-Square analysis to explore the potential relationships between various variables and RME user satisfaction in the sample studied. The corresponding p-values were used to evaluate the statistical significance of these relationships. Results were obtained as follows:

Tabel 2. Relationship between factors influencing satisfaction with the use of RME (n=32)

Variables	Category	Satisfaction with RME				*p-value*
		Satisfied		Not Satisfied		
		n	%	n	%	
Content	Good	18	85,7	3	14,3	0,013
	Not so good	4	36,4	7	63,6	
Accuracy	Accurate	19	82,6	4	17,4	0,013
	Inaccurate	3	33,3	6	66,7	
Format	Good	17	89,5	2	10,5	0,005
	Not so good	5	38,5	8	61,5	
Ease of use	Easy	18	85,7	3	14,3	0,013
	Not Easy	4	36,4	7	63,6	
Timeliness	On Time	20	87,0	3	13,0	0,001
	Not on time	2	22,2	7	77,8	

DISCUSSION

The Relationship between Content and Satisfaction of Using Electronic Medical Records in Using RME

This variable is essential in information systems because it is used to gauge users' satisfaction with the system's content. Content variables arise when data is entered and processed to create information that satisfies user needs. The degree to which the information satisfies user needs determines the user satisfaction level; the more comprehensive the information supplied by the system, the higher the user satisfaction level. [6]

With a p-value of 0.013 (p <0.05), the findings indicated a significant correlation between content and satisfaction with EMR. About 85.7% of respondents said they were happy with the information provided by RSI Sultan Agung's electronic medical record system.

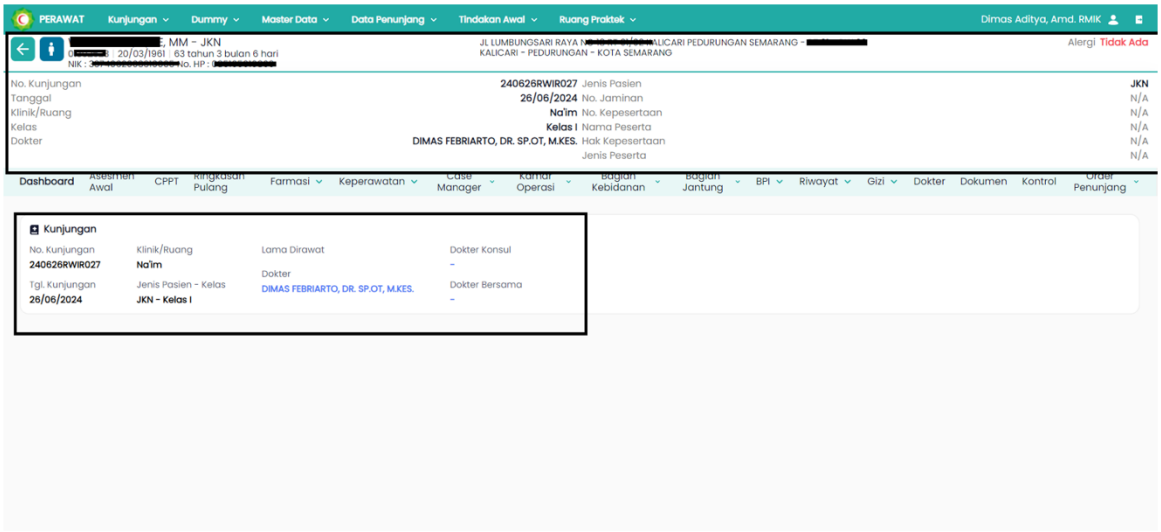

Figure 1. Social Data of RME RSI Sultan Agung

Figure 1. shows the content of the EMR system at RSI Sultan Agung, which contains patient social data; medical staff can view patient visit details and other relevant information to provide appropriate care. The top section contains patient identity data, including medical record number, name, date of birth, age, and phone number. The system also displays information related to the patient's visit, such as the visit number, date of the most recent visit, and the treating doctor's name. At the bottom is a summary of the patient's visit history, making it easier for medical personnel to monitor the treatment history. With a concise and integrated display, this interface helps medical staff manage and access patient information efficiently, supporting targeted and accurate data-driven care.

Respondents' satisfaction with the content of the EMR system at RSI Sultan Agung related to the content of the information provided has been able to provide the information needed and provide reports that are useful for work. EMR users consider the content of the information generated in the EMR output significant, especially for the decision-making process.

The findings of this study are corroborated by Farihatul Hanesya's research (2021), which demonstrates a strong correlation between content and user satisfaction. As the p-value of 0.000 is lower than the alpha level of 5% (0.05), there is a significant relationship between user satisfaction and content on SIMRS. [7] Another study by Gamasiano Alfiansyah, 2020 that user satisfaction with the content of the existing EHR at Dr Cipto Mangunkusumo Hospital is reasonable at 46% and has been integrated into INA-CBGs e-claims, making it easier for officers. [8]

The Relationship between Accuracy and Satisfaction of Using Electronic Medical Records in Using RME

After the system processes the input into information, the accuracy variable, a dimension, is used to gauge how satisfied the user is with the accuracy of the data. [9] Measuring overall EUCS requires the information produced by the system to be accurate. Consequently, this may result in positive end-user perceptions regarding overall satisfaction. According to the results, 82.6% of respondents were satisfied using EMR.

Its statistical technique produced a p-value of 0.013, which is less than 0.05 and indicates a significant correlation between satisfaction with Electronic Medical Records and accuracy. In other words, the level of data accuracy in electronic medical records significantly affects user satisfaction. Respondents who rated accuracy as accurate tended to be 9.5 times more satisfied than those who rated inaccuracy in the electronic medical record system at RSI Sultan Agung Semarang. Users who were confident with the accuracy of the information were also happy with the system as a whole., ini masih kategori hasil, jd perlu penjelasan

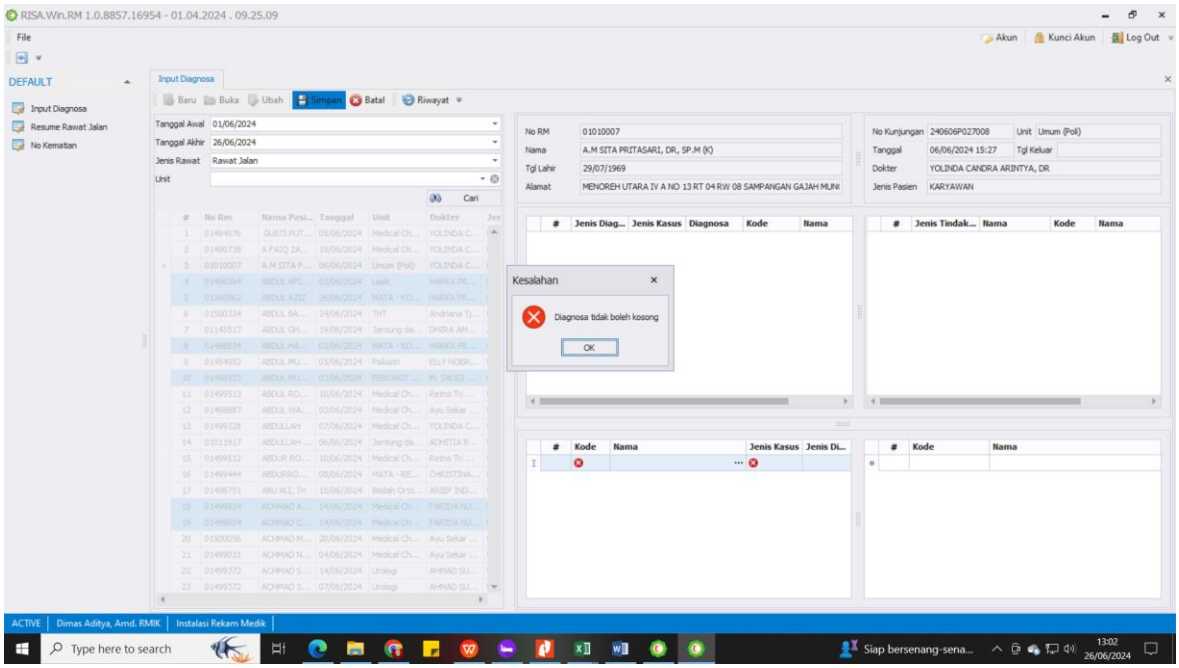

Figure 2. RSI Sultan Agung RME Data Validation

The data validation in the electronic medical record system of RSI Sultan Agung Semarang is a critical process to ensure that the information inputted into the system is correct, thorough and consistent. Figure 2 shows an error message indicating that diagnoses should not be blank, an example of data entry validation preventing users from saving incomplete data. This kind of validation helps maintain data quality in the system. By implementing rigorous and structured validation methods, RSI Sultan Agung Semarang can ensure that the data in the electronic medical record system is always accurate, complete, and reliable for medical decision-making.

According to prior research, high information quality has been linked to system usage, user satisfaction, and benefits. [10] Therefore, accepting the existing electronic medical record system at RSI Sultan Agung Semarang depends on the accuracy of the information generated and the benefits obtained. Information influences the accuracy of decisions, which depends on the information received.

The Relationship between Format and Satisfaction of Using Electronic Medical Records in Using RME

Based on the visual style of the system interface design, user satisfaction is evaluated using the variable format. The system's ability to generate reports or information will be assessed according to how visually appealing the interface is, which may indirectly impact how well users use the system. [9] Based on the results of Table 2, the respondents (89.5%) were satisfied with the format of the electronic medical record system at RSI Sultan Agung Semarang. According to statistical data, a significant correlation (p-value of 0.005) exists between user satisfaction with Electronic Medical Records and appearance format. In line with research conducted by Nina Marlina (2023), there is a relationship between the appearance format of the Automated Registration Machine system at Duren Sawit Hospital with a p-value of 0.016. An attractive appearance will make users feel not bored so that it will be possible to be satisfied with using the system. [11]

Supported by research by Deby Natalia (2024) there were 23 respondents (76.7%) who were satisfied with SIMPUS because the menu structure was organized and the appearance was attractive, making users not bored doing their job for a long time. [12] Most users are satisfied with the format of the electronic medical record system at RSI Sultan Agung, and this format is expected to affect user satisfaction. This study supports Adrianti's (2018) research, which found increased user efficiency in the Puskesmas electronic information system with appropriate format support. [13]

The Relationship between Ease of Use and Satisfaction with Electronic Medical Records in Using RME

User-friendliness is becoming increasingly crucial in software development. Much evidence indicates that the effectiveness of an application's functionality is primarily determined by its ease of use. User satisfaction is indicated by the ease of use of the system's simplicity during the data entry and processing stages and information retrieval. [9] When users find an application friendly, they can become

more skilled and able to optimize the software's various features. In addition, ease of use can boost productivity and allow decision-makers to evaluate more options. Conversely, if the system is challenging to learn, then users are less likely to use it. Management will only invest a little time in training employees to be more proficient in using the information system.

Ease of use is expected to increase employee satisfaction with EMR at RSI Sultan Agung Semarang. Based on the results of the study, EMR users were satisfied with using EMR by 85.7%, and ease of use has a significant relationship related to user satisfaction in using EMR at RSI Sultan Agung Semarang with a p-value of 0.013, which means that there is a substantial relationship between ease of use on satisfaction in using Electronic Medical Records at RSI Sultan Agung Semarang (OR = 10.5), the easier it is for users to use EMR the higher the user satisfaction in using EMR at RSI Sultan Agung Semarang. Users feel that the EMR system is very user-friendly and takes little time to operate. Before using the EMR system, users received training related to SIMRS. This is supported by research conducted by Siregar (2021), which found that users are delighted with the ease of using SIMRS at Doloksanggul Hospital, a very user-friendly and easy-to-operate SIMRS. [14] According to research by Rizqulloh (2022), there is a significant correlation (p-value 0.000) between the Rowosari Health Center's PUSTAKA application's ease of use and its utilization. [15]

User-friendliness is balanced with user training in the EMR for staff who record and report patient documents. Planning, arranging, and instructing users on using EMR correctly have been identified as crucial enablers for attaining the best possible results. [16] For this reason, training policies and techniques are crucial to the effective use of technology and the long-term adoption of electronic medical record systems. [17]

The Relationship of Timeliness to Satisfaction with Using Electronic Medical Records in Using RME

The timeliness factor contributes to user satisfaction because timeliness is about the length of time it takes to deliver information to users. One can classify a timely system as a real-time system. This implies that the user won't have to wait long for the output to be displayed correctly because every request or input will be handled immediately. This is crucial because information delivery delays aggravate customers and hurt user satisfaction.

The findings demonstrated that respondents (87%) were happy with the EMR system at RSI Sultan Agung's timeliness, and there was a significant correlation between the two with a p-value of 0.001 OR 23.3 for user satisfaction. The better the electronic medical record system provides up-to-date and fast data when needed, the more satisfied medical record officers use the system in their work.

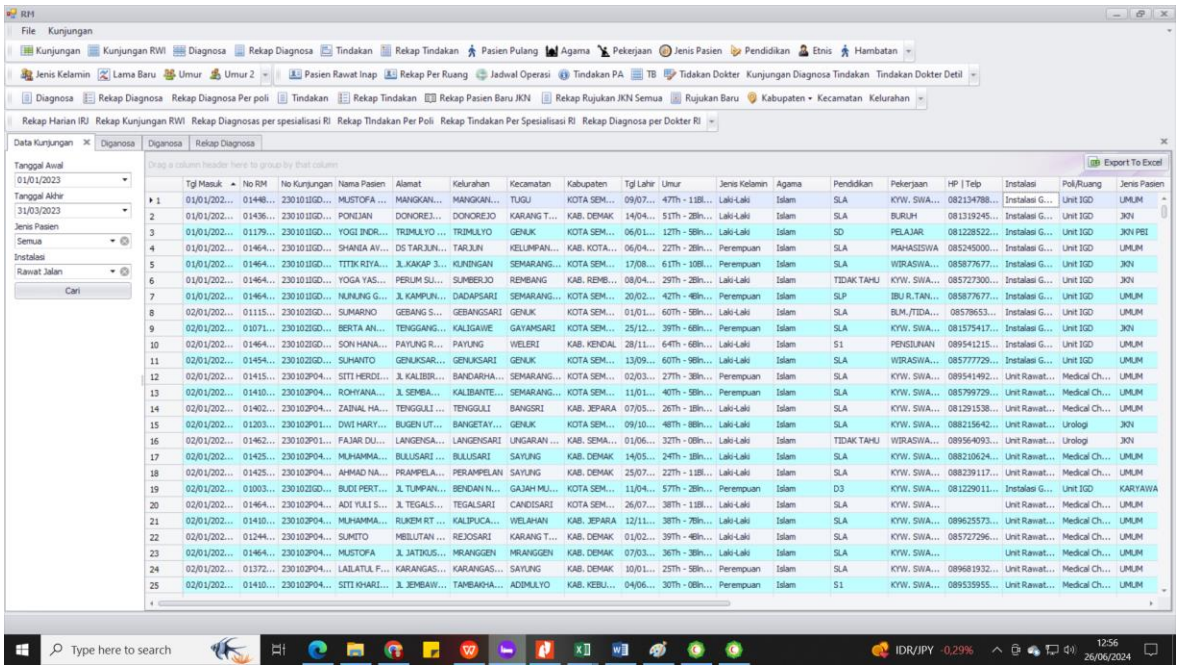

Figure 3. Daily Census Data of RSI Sultan Agung RME System

Figure 3. shows patient visit data at RSI Sultan Agung Semarang for 2023. The data includes patient demographic information, visit details, and contact information. The system allows users to filter and search the data based on various criteria and provides the option to export the data for further analysis. This interface helps medical and administrative staff manage patient data efficiently, ensuring that all critical information is recorded and easily accessible when needed. Daily census data for Outpatient, Emergency Department, and Inpatient has been systematically captured in the RM reporting system, making it easily accessible when data is needed. The timeliness generated from the RME system at RSI Sultan Agung is good enough to provide the information needed for decision-making, it's just that system development needs to be improved because it still uses a lot of paper and manual writing, so sometimes decisions take a long time to make.

Improving the quality of a perfect system will influence user satisfaction. [18] User satisfaction with information systems shows how well the system meets users' information needs. [19] Timeliness significantly affects user satisfaction. [20] This study supports the findings of Ida Herwati (2023), who found that, with a p-value of 0.003, the timeliness factor substantially impacts the connection between content variables and user satisfaction with SIMRS. The most up-to-date information system, SIMRS, is used at Mitra Delima Hospital to present information data quickly and without waiting, affecting the efficacy and efficiency of the work performed by hospital staff members. [21]

CONCLUSIONS AND RECOMMENDATIONS

The findings demonstrated how user satisfaction with electronic medical records at the Medical Records Installation of RSI Sultan Agung Semarang is influenced by content variables, accuracy, format, ease of use, and timeliness. Although the RSI Sultan Agung Semarang Electronic Medical

Record system has been operating efficiently in general, further efforts are required to enhance its development for quick and effective access, thereby improving the timeliness of medical services. Future research should investigate more variables, and longitudinal studies should be carried out to track how user satisfaction changes over time.

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