

## **CASH MANAGEMENT OPTIMIZATION TO MINIMIZE IDLE CASH: A MILLER–ORR MODEL APPROACH IN THE WORK ACCIDENT BENEFIT (JKK) PROGRAM OF BPJS KETENAGAKERJAAN**

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### **Abstract**

This study aims to analyze the effectiveness of cash management in minimizing idle cash in the Work Accident Benefit (JKK) Program of BPJS Ketenagakerjaan through a conceptual approach based on the Miller–Orr model. Cash management in public fund institutions faces a fundamental challenge in balancing liquidity requirements for benefit payments and optimizing fund utilization to generate returns. In practice, conservative cash holding policies may lead to idle cash, resulting in opportunity costs. This research adopts a qualitative approach using an exploratory case study design, relying on literature analysis and comparison of previous research findings. The Miller–Orr model is applied conceptually to illustrate the mechanism for determining optimal cash balances under stochastic cash flow conditions. The expected results indicate the potential existence of excess cash balances beyond optimal levels, as evidenced in prior studies. This suggests that stochastic-based cash management models have the potential to improve efficiency by balancing liquidity and profitability. This study contributes theoretically to the development of cash management literature in the social security sector and provides practical insights for formulating more adaptive and data-driven cash management policies.

**Keywords:** cash management, idle cash, opportunity cost, Miller–Orr model, BPJS Ketenagakerjaan

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### **INTRODUCTION**

Cash management is a fundamental function in financial management that plays a crucial role in ensuring the sustainability of organizational operations. Conceptually, cash management aims to maintain sufficient liquidity to meet short-term obligations while optimizing the utilization of funds to generate maximum returns (Brigham & Houston, 2019; Ross et al., 2018). In practice, cash management involves a trade-off between liquidity and profitability, where excess cash results in opportunity costs, while insufficient cash may disrupt operational stability.

In recent years, international literature has emphasized that cash management is no longer merely operational in nature but has evolved into a strategic instrument for enhancing financial efficiency and organizational resilience. A study by Anorue and Ugwoke (2022) shows that effective cash management practices improve working capital efficiency and strengthen financial stability. Furthermore, Bhuiyan and Hooks (2019) highlight that excess cash that is not optimally utilized can negatively affect financial performance due to the opportunity cost of holding cash. In the context of global uncertainty, including interest rate fluctuations and inflationary pressures, the need for adaptive cash management has become increasingly critical (Dokas et al., 2023).

The issue of cash optimization becomes more complex in public fund management institutions such as BPJS Ketenagakerjaan, which is responsible for managing large-scale participant contributions and ensuring the sustainability of social security programs. As a public legal entity, BPJS Ketenagakerjaan is required to balance liquidity for benefit payments and optimal fund development. This aligns with public financial management principles that emphasize efficiency, effectiveness, and accountability in fund management (Agung, 2021).

One of the programs with complex cash flow characteristics is the Work Accident Benefit (JKK) program, where cash outflows are stochastic due to their dependence on unpredictable work accident events. This condition encourages fund managers to maintain cash balances as a liquidity buffer. However, overly conservative cash holding policies may lead to the accumulation of idle cash, which does not generate optimal returns and results in inefficiencies in fund management (Agung, 2021).

The phenomenon of idle cash is not limited to the social security sector but is also widely observed in both public and corporate sectors. Studies on government cash management indicate that minimum cash balance policies often result in cash holdings exceeding optimal levels, thereby increasing the cost of funds (Agung, 2021). In the corporate sector, research by Gunawan (2026) shows that excessive corporate cash holdings relative to optimal needs indicate significant opportunity losses. Similar findings have been reported in regional government studies, which reveal a gap between actual and optimal cash balances (Ranitha, 2022). Empirical evidence also shows that high levels of cash holding can negatively impact firm growth because funds are not used productively, thereby reducing opportunities for expansion and investment (Islam et al., 2023).

In modern financial literature, cash optimization can be achieved through quantitative models. The Miller–Orr model is one of the most widely used models in conditions of uncertain cash flows, as it accommodates cash flow fluctuations by establishing a lower limit, upper limit, and return point as the basis for financial decision-making (Nurillah et al., 2020). Recent international studies indicate that stochastic-based models such as the Miller–Orr model are more effective in managing cash flow volatility compared to deterministic models, particularly in dynamic and uncertain business environments (Kontuš, 2018; Jiang & Wu, 2022).

Previous studies demonstrate that the application of the Miller–Orr model can improve cash management efficiency and minimize idle cash. Research on BPJS Ketenagakerjaan's Old-Age Benefit (JHT) program found the presence of opportunity losses due to excess cash that was not optimally invested, which could be reduced through the application of the Miller–Orr model (Khotimah, 2016). In addition, studies in cooperative and corporate sectors show that the use of quantitative models in cash management results in more optimal cash balances compared to conventional approaches (Yupitasari et al., 2019).

However, empirical studies on the application of cash management models in the social security sector, particularly in the Work Accident Benefit (JKK) program, remain limited. Most previous studies focus on corporate or government cash management, with limited attention to the unique characteristics of stochastic and risk-based cash flows in social security programs. This research gap highlights the need for further study to understand how cash management models can be optimally implemented in the context of social security.

Based on this background, this study aims to analyze the effectiveness of cash management in minimizing idle cash in the Work Accident Benefit (JKK) program of BPJS Ketenagakerjaan using the Miller–Orr model, and to develop more efficient and adaptive cash management strategies. This study is expected to contribute theoretically to the development of stochastic-based cash management literature in the public sector, as well as practically in supporting the formulation of more optimal, transparent, and sustainable cash management policies.

This study adopts an exploratory and conceptual approach; therefore, the results presented are expected outcomes supported by literature and prior research findings. Accordingly, this study

does not aim to empirically test the model but to develop a conceptual framework relevant to cash management in the social security context.

## **LITERATURE REVIEW**

### **2.1 Cash Management**

Cash management is one of the core functions in financial management, focusing on managing cash inflows and outflows to ensure liquidity availability while optimizing the utilization of funds. Conceptually, cash management aims to maintain a balance between short-term liquidity needs and efforts to maximize returns from available funds (Brigham & Houston, 2019; Ross et al., 2018). In practice, effective cash management enables organizations to meet operational obligations on time while avoiding the accumulation of unproductive funds.

In modern financial literature, cash management is no longer viewed solely as an operational function but also as a strategic instrument for enhancing financial efficiency and organizational resilience. A study by Anorue and Ugwoke (2022) shows that effective cash management contributes to improved financial performance through more efficient use of working capital. In addition, proper cash management reduces liquidity risk and enhances financial flexibility in responding to economic uncertainty (Jiang & Wu, 2022).

However, the main challenge in cash management lies in determining the optimal level of cash holdings. Excessive cash can result in idle cash that does not generate returns, while insufficient cash may increase the risk of failing to meet short-term obligations. Therefore, organizations must carefully manage their cash balances to achieve an optimal balance between liquidity and profitability through effective cash planning and control.

### **2.2 Idle Cash and Opportunity Cost**

Idle cash refers to cash funds that are not utilized productively in operational activities or investments, thus failing to contribute to the organization's value creation. From a financial perspective, the existence of idle cash generates opportunity costs, defined as the potential returns that are lost because the funds are not invested in income-generating instruments (Bhuiyan & Hooks, 2019).

The phenomenon of idle cash frequently occurs in organizations that adopt conservative cash holding policies, especially under conditions of uncertain cash flows. In the public sector, studies indicate that high minimum cash balance policies often lead to cash accumulation exceeding operational needs, thereby increasing the cost of funds and reducing financial management efficiency (Agung, 2021). This condition demonstrates that suboptimal cash management can negatively affect financial performance in both public and corporate sectors.

Research in the corporate sector also shows that excessive cash holdings can reduce organizational efficiency. Bhuiyan and Hooks (2019) find that excess cash has a negative relationship with firm performance because it increases opportunity costs and reduces the efficiency of resource allocation. Therefore, it is essential for organizations to manage cash balances optimally to minimize idle cash without compromising liquidity.

In the context of firm growth, cash holding plays a dual role. On one hand, cash provides financial flexibility to support investment and operations. On the other hand, excessive accumulation of cash may reduce firm performance because funds are not utilized productively. Empirical evidence indicates that high cash holding is negatively associated with firm growth, highlighting the importance of optimal cash management (Islam et al., 2023).

### **2.3 Optimal Cash Management Models**

To address the challenge of determining optimal cash balances, various cash management models have been developed in financial literature. These models aim to assist organizations in determining ideal cash levels by considering transaction costs, interest rates, and cash flow characteristics.

One of the earliest models is the Baumol model, which adapts the Economic Order Quantity (EOQ) concept from inventory management. This model assumes that cash flows are constant and predictable, making it suitable for relatively stable conditions. However, in practice, many organizations face fluctuating and uncertain cash flows, rendering deterministic models such as Baumol less applicable (Yupitasari et al., 2019).

As an extension of deterministic models, the Miller–Orr model was introduced to accommodate stochastic cash flow conditions. This model establishes a lower limit (*lower limit*), an upper limit (*upper limit*), and a return point (*return point*) as the basis for decision-making in cash management. When cash balances reach the upper limit, organizations are advised to invest excess cash, whereas when balances approach the lower limit, organizations need to withdraw funds to maintain liquidity (Nurillah et al., 2020).

The primary advantage of the Miller–Orr model lies in its ability to efficiently manage cash flow volatility. Studies indicate that this model is more adaptive in dealing with uncertainty compared to deterministic models, making it more relevant for organizations with fluctuating cash flow characteristics (Kontuš, 2018). Therefore, the Miller–Orr model has become one of the most widely used approaches in research related to cash optimization.

#### **2.4 Cash Management in the Public and Social Security Sectors**

Cash management in the public sector differs from that in the corporate sector, particularly in terms of objectives. Public sector fund management is not solely profit-oriented but also aims to ensure service delivery and program sustainability. In this context, cash management must ensure liquidity for payment obligations while optimizing fund utilization to enhance public welfare. Studies on government cash management indicate that suboptimal minimum cash balance policies can lead to inefficiencies in public fund management. Research shows that actual cash balances often exceed optimal levels, suggesting the potential for efficiency improvement through better cash management (Agung, 2021). Similar findings have been observed in regional governments, where gaps between actual and optimal cash balances indicate the presence of idle cash (Ranitha, 2022).

In the context of BPJS Ketenagakerjaan, previous research on the Old-Age Benefit (JHT) program identified opportunity losses resulting from excess cash that was not optimally invested. The application of the Miller–Orr model in that study successfully identified optimal cash levels and provided recommendations for more efficient cash management (Khotimah, 2016). However, studies specifically addressing cash management in the Work Accident Benefit (JKK) program remain limited. The JKK program has unique cash flow characteristics influenced by unpredictable accident risks, requiring a more adaptive cash management approach. Therefore, this study is important in filling the literature gap regarding the application of cash management models in the social security sector, particularly in optimizing cash management in the JKK program.

#### **2.5 Research Framework**

Based on the literature review, optimal cash management aims to achieve a balance between liquidity and profitability. In this context, idle cash serves as a key indicator of inefficiency, as it generates opportunity costs due to suboptimal fund utilization. Therefore, an approach is needed to identify optimal cash balance limits so that organizations can minimize idle cash without compromising their ability to meet liquidity obligations.

The Miller–Orr model is a relevant approach under stochastic cash flow conditions because it accommodates cash flow fluctuations by establishing lower limits (*lower limit*), upper limits (*upper limit*), and return points (*return point*) as the basis for financial decision-making (Nurillah et al., 2020). This model has been widely used in various studies to determine optimal cash balances and has been proven to improve cash management efficiency in both corporate and public sectors. In this study, the Work Accident Benefit (JKK) program of BPJS Ketenagakerjaan is positioned as a case study with uncertain cash flow characteristics, where claims occur randomly and are difficult to predict. This condition may encourage conservative cash management policies, thereby

increasing the risk of idle cash. Therefore, the application of the Miller–Orr model is considered appropriate to evaluate and formulate more optimal cash balance policies.

However, due to data limitations, quantitative analysis is not conducted empirically. Consequently, the determination of optimal cash balances in this study is conceptual and based on expected outcomes derived from theoretical frameworks and supported by previous research findings. This approach remains relevant in exploratory studies, particularly in providing preliminary insights into potential cash management optimization in the JKK program.

Several previous studies indicate that the application of the Miller–Orr model can identify excess cash balances relative to optimal levels. Research on BPJS Ketenagakerjaan’s Old-Age Benefit (JHT) program found opportunity losses due to idle funds that could be minimized through this model (Khotimah, 2016). In addition, corporate sector studies show that actual cash balances often exceed optimal levels recommended by the model, indicating inefficiencies in cash management (Gunawan, 2026). Similar findings have been reported in government and regional contexts, where gaps between actual and optimal cash balances indicate the presence of idle cash (Agung, 2021; Ranitha, 2022).

Based on these findings, this study’s framework positions:

- Cash flows (cash inflows and cash outflows) as the primary factors influencing liquidity needs
- Cash balance policies as mechanisms for liquidity control
- The Miller–Orr model as an analytical tool for determining optimal cash limits
- Optimal cash balance as the expected output, and
- Idle cash and opportunity cost as indicators of cash management efficiency.

Thus, this study not only aims to conceptually identify idle cash but also to provide strategic recommendations based on literature regarding how cash management in the JKK program can be optimized through a quantitative model approach. The expected outcomes of this study are normative and exploratory, serving as a foundation for future empirical research. To clarify the relationships among concepts and the analytical flow of the study, the research framework is visually presented in Figure 1.

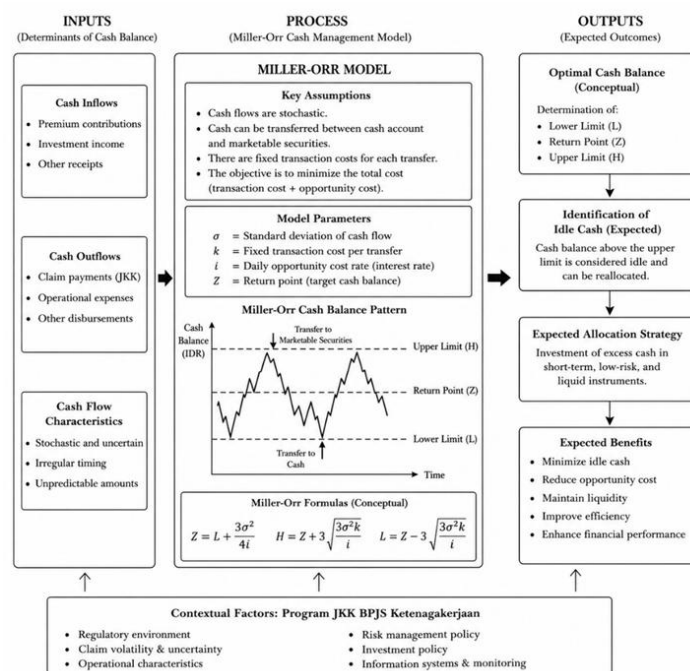


Figure 1. Conceptual Framework of the Miller–Orr Model in Cash Management for the Work Accident Benefit (JKK) Program

## RESEARCH METHODS

### 3.1 Research Design

This study employs a qualitative approach with an exploratory case study design. This approach is selected because the study aims to understand the phenomenon of cash management in depth within a specific context, namely the Work Accident Benefit (JKK) program of BPJS Ketenagakerjaan, and to develop a conceptual framework for cash optimization based on relevant theories and literature.

The exploratory case study design is used to provide preliminary insights into the phenomenon of idle cash and cash management in social security institutions that exhibit stochastic cash flow characteristics. This approach is appropriate when empirical data are not available, while the researcher seeks to develop a conceptual model based on theoretical frameworks and prior research findings (Yin, 2018).

### 3.2 Data and Data Sources

In this study, the data used are not in the form of actual numerical data but consist of the key components required in the Miller–Orr model, which serve as the basis for conceptual analysis in determining optimal cash balances.

The main components of the Miller–Orr model include:

a. Lower limit (L)

This represents the minimum level of cash balance that must be maintained by the organization to ensure sufficient liquidity in meeting operational obligations. The lower limit is typically determined based on management policies and the acceptable level of liquidity risk.

b. Cash flow variance ( $\sigma^2$ )

This reflects the degree of fluctuation in daily cash flows, representing the uncertainty in cash inflows and outflows. A higher variance indicates greater uncertainty in cash flow conditions.

c. Transaction cost (b)

This refers to the cost incurred whenever the organization converts cash into other financial instruments or vice versa, such as administrative costs or liquidation costs.

d. Interest rate (i)

This represents the rate of return from short-term investments and serves as the basis for calculating the opportunity cost of holding idle cash.

Based on these components, the Miller–Orr model is used to determine the upper limit and return point as the basis for optimal cash balance management.

The data source in this study is BPJS Ketenagakerjaan, particularly information related to the cash flow characteristics of the JKK program. Although quantitative data are not directly utilized, the operational context of BPJS Ketenagakerjaan serves as the foundation for the conceptual analysis.

### 3.3 Data Analysis Technique

The data analysis technique used in this study is based on the Miller–Orr model. The analysis is conducted using a descriptive-analytical approach through the following stages:

- Reviewing theories related to cash management, idle cash, and cash optimization
- Synthesizing findings from relevant previous studies
- Conceptually applying the Miller–Orr model to illustrate optimal cash management mechanisms.

The Miller–Orr model is used to explain how optimal cash balances can be determined through the establishment of lower limits, upper limits, and return points under stochastic cash flow conditions (Nurillah et al., 2020).

Although quantitative calculations are not performed in this study, the model is applied conceptually to:

- a. Illustrate cash balance control mechanisms
- b. Identify potential idle cash
- c. Formulate recommendations for more optimal cash management policies.

This approach is supported by previous studies indicating that the Miller–Orr model is effective in identifying imbalances between actual and optimal cash balances across various sectors (Gunawan, 2026; Agung, 2021).

### **3.4 Research Validity**

The validity of this study is ensured through consistency and synthesis of relevant literature. Various sources from scientific journals and previous research are compared to ensure that the analysis is grounded in a strong theoretical foundation.

This approach is commonly used in conceptual research to generate preliminary insights that can be further tested through empirical studies (Saunders et al., 2019).

This study adopts an exploratory and conceptual approach; therefore, it does not aim to empirically test the model. The findings presented represent expected outcomes developed based on theoretical frameworks and prior research.

## **RESULTS AND DISCUSSION**

### **4.1 Cash Management in the JKK Program**

Cash management in the Work Accident Benefit (JKK) program of BPJS Ketenagakerjaan has distinct characteristics compared to those in the corporate sector. This is primarily due to the stochastic nature of cash flows, where cash outflows depend on work accident claim events that are difficult to predict both in timing and magnitude.

Under such conditions, fund managers tend to adopt conservative cash holding policies by maintaining a certain level of cash as a liquidity buffer. This approach aims to ensure the availability of funds to meet benefit payment obligations in a timely manner. However, excessively conservative policies may lead to the accumulation of idle cash that does not generate optimal returns (Agung, 2021).

This phenomenon is consistent with findings in financial literature, which suggest that organizations facing high cash flow uncertainty tend to hold larger cash balances as a risk mitigation strategy, even though this may reduce overall efficiency in fund management (Bhuiyan & Hooks, 2019). Therefore, an approach is needed to balance liquidity requirements with the optimal utilization of cash.

### **4.2 Expected Analysis: Determination of Optimal Cash Balance Using the Miller–Orr Model**

In this study, the determination of the optimal cash balance is not conducted empirically due to data limitations but is developed conceptually based on the Miller–Orr model. This model provides an analytical framework for determining lower limits (*lower limit*), upper limits (*upper limit*), and return points (*return point*) as the basis for optimal cash management (Nurillah et al., 2020).

Conceptually, the application of the Miller–Orr model in the JKK program is expected to result in:

- a. The establishment of a lower limit as the minimum liquidity level that must be maintained
- b. The determination of an upper limit as an indicator of excess cash that should be invested
- c. The identification of a return point as the optimal cash balance level after adjustments.

Using this framework, cash balances that exceed the optimal threshold can be identified as idle cash, which should ideally be allocated to short-term investment instruments, such as call deposits, to generate additional income. Conversely, when cash balances fall below the minimum threshold, the organization needs to liquidate investments or withdraw funds to maintain operational continuity.

Although quantitative analysis is not performed, this approach provides a conceptual understanding of how cash management can be optimized through stochastic model-based control mechanisms.

#### **4.3 Comparison with Previous Research Findings**

The expected outcomes of this study are supported by empirical findings from previous research. A study on BPJS Ketenagakerjaan's Old-Age Benefit (JHT) program identified potential opportunity losses resulting from excess cash balances, which could be minimized through the application of the Miller–Orr model (Khotimah, 2016).

In addition, research in the corporate sector shows that actual cash balances often exceed optimal levels recommended by quantitative models. Gunawan (2026) found that companies tend to maintain significantly higher cash balances than necessary, leading to potential income loss from uninvested funds.

In the public sector, Agung (2021) demonstrated that minimum cash balance policies often result in higher-than-optimal cash holdings, thereby increasing the cost of funds. These findings are reinforced by Ranitha (2022), who identified significant gaps between actual and optimal cash balances in regional government cash management.

The consistency of these findings indicates that the idle cash phenomenon is a common issue across various sectors, and that the application of quantitative cash management models such as Miller–Orr can serve as an effective solution to improve efficiency.

#### **4.4 Managerial Implications**

Based on the conceptual analysis and supporting literature, this study provides several managerial implications for cash management in the JKK program of BPJS Ketenagakerjaan.

First, there is a need to shift from static and historically based cash balance policies toward more dynamic, model-based approaches. The application of the Miller–Orr model enables fund managers to determine optimal cash limits more objectively and systematically.

Second, cash management can be optimized by allocating excess funds into short-term, liquid, and low-risk investment instruments to generate additional returns without compromising liquidity. This aligns with fundamental cash management principles that emphasize efficient fund utilization (Brigham & Houston, 2019).

Third, strengthening real-time cash flow monitoring systems is essential to support faster and more accurate decision-making. The use of technology in cash management can enhance an organization's ability to anticipate cash flow fluctuations and optimize fund allocation (Jiang & Wu, 2022).

#### **4.5 Discussion and Research Contribution**

This study contributes to expanding the understanding of cash management in the social security sector, particularly under conditions of limited empirical data. By adopting a conceptual approach based on the Miller–Orr model, this study indicates that cash optimization can still be analyzed through theoretical frameworks supported by empirical evidence from previous studies. From a theoretical perspective, this study reinforces the importance of stochastic approaches in cash management for organizations with uncertain cash flows. From a practical perspective, it provides preliminary recommendations for BPJS Ketenagakerjaan in developing more efficient and adaptive cash management policies.

However, this study has limitations, particularly the absence of empirical data for direct quantitative analysis. Therefore, future research is recommended to utilize actual cash flow data to empirically test the effectiveness of the Miller–Orr model in the context of the JKK program.

## CONCLUSION

This study aims to analyze the effectiveness of cash management in minimizing idle cash in the Work Accident Benefit (JKK) program of BPJS Ketenagakerjaan through a conceptual approach based on the Miller–Orr model. Based on the literature review and conceptual analysis conducted, it can be concluded that cash management in social security programs faces a fundamental challenge in balancing liquidity requirements and the optimal utilization of funds.

The stochastic nature of cash flows in the JKK program encourages fund managers to adopt conservative cash holding policies. However, such an approach may lead to the accumulation of unproductive idle cash and result in opportunity costs for the organization (Agung, 2021). Therefore, a more adaptive and model-based approach is required to determine optimal cash balances.

The Miller–Orr model, as a stochastic cash management model, provides a relevant framework for managing cash flow fluctuations through the establishment of lower limits, upper limits, and return points. Although this study does not conduct empirical calculations, the expected results indicate that the application of this model has the potential to identify excess cash balances relative to optimal levels, as demonstrated in previous studies in both public and corporate sectors (Khotimah, 2016; Gunawan, 2026).

From a theoretical perspective, this study contributes to the development of literature on stochastic cash management models in the social security sector, which remains relatively limited compared to the corporate sector. From a practical perspective, this study provides preliminary recommendations for BPJS Ketenagakerjaan to develop more efficient, dynamic, and data-driven cash management policies in order to minimize idle cash and enhance the value of benefits for participants.

However, this study has a primary limitation in the absence of empirical data, which restricts the ability to conduct direct quantitative analysis. Therefore, future research is recommended to utilize actual cash flow data to empirically test the effectiveness of the Miller–Orr model in determining optimal cash balances in the JKK program. Additionally, future studies may integrate alternative models or forecasting-based approaches to improve the accuracy of cash management strategies.

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