

Operational And Informational Systems Are Generally Separated Because Of Which Of The Following Factors?A)

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In the rapidly evolving world of information technology and business management, understanding the distinction between operational and informational systems is crucial. These two types of systems play vital roles in supporting organizational functions, yet they are typically kept separate due to specific factors that ensure efficiency, security, and data integrity. This article explores the primary reasons behind the separation of operational and informational systems, providing a comprehensive overview that benefits IT professionals, business managers, students, and anyone interested in organizational information systems.

Understanding Operational and Informational Systems

Before delving into the factors that lead to their separation, it is essential to define what operational and informational systems are and how they differ.

Operational Systems (Transaction Processing Systems)

Operational systems, often referred to as transaction processing systems (TPS), are designed to manage and record the day-to-day transactions of an organization. They handle routine activities such as order processing, payroll, inventory management, and billing. The primary goal of these systems is to support operational efficiency and ensure that business processes run smoothly.

Characteristics of Operational Systems:

- Real-time data processing
- High volume of transactions
- Focus on accuracy and speed
- Support for routine, repetitive tasks

Informational Systems (Management Information Systems and Decision Support Systems)

Informational systems collect, process, and analyze data generated by operational systems to provide managers with insights needed for strategic decision-making. These systems include management information systems (MIS), decision support systems (DSS), and enterprise resource planning (ERP) systems.

Characteristics of Informational Systems:

- Data aggregation and summarization
- Focus on reporting and analysis
- Support for strategic planning and decision-making
- Usually operate on historical data

Reasons for Separating Operational and Informational Systems

While operational and informational systems are interconnected, their separation is a deliberate design choice driven by various factors. Understanding these factors helps organizations optimize both system performance and data security.

1. Different Objectives and Requirements

The fundamental reason for separating these systems lies in their differing objectives:

- Operational Systems aim for efficiency, speed, and accuracy in transaction processing.
- Informational Systems focus on providing insights, analysis, and reporting for strategic decisions.

Because these objectives demand different processing speeds, data formats, and functionalities, combining them could compromise performance or data quality.

2. Data Integrity and Security Concerns

Operational systems often contain sensitive, real-time data critical to daily business functions. Exposing this data to analytical processes or external users may pose security risks. Separating systems helps:

- Protect transactional data from unauthorized access
- Minimize the risk of data corruption or loss during analysis
- Comply with data privacy regulations

3. Performance Optimization

Operational systems need to process a high volume of transactions rapidly. Analytical queries, on the other hand, involve complex computations on large datasets, which can slow down operational systems if run simultaneously.

- Separation ensures that analytical workloads do not interfere with transaction processing
- Dedicated informational systems can be optimized for large-scale data analysis

4. Data Processing and Storage Differences

Operational systems process current, detailed data, while informational systems often work with summarized or historical data.

- Storing detailed transaction data in operational systems enhances speed
- Summarized data in informational systems facilitates reporting and analysis without burdening operational databases

5. Flexibility and Scalability

Separating systems allows organizations to:

- Update or upgrade one system without affecting the other
- Scale analytical capabilities independently from operational processes
- Implement specific data management policies suited to each system

6. Compliance and Regulatory Requirements

Many industries have strict regulations regarding data handling, security, and auditability. Separation helps organizations:

- Maintain compliance by isolating sensitive operational data
- Simplify audit processes by having distinct data repositories

Implications of System Separation for Organizations

The separation of operational and informational systems has several practical implications:

Enhanced Data Security

By segregating systems, organizations can implement tailored security measures, limiting access to sensitive operational data and reducing vulnerability to cyber threats.

Improved System Performance

Operational systems remain fast and responsive, handling routine transactions efficiently, while informational systems can process large data volumes for analysis without affecting operational throughput.

Better Data Management

Separation simplifies data governance, quality control, and compliance efforts, ensuring that each system maintains data integrity suited to its purpose.

Cost and Maintenance Considerations

While maintaining separate systems might entail additional costs, the benefits in performance, security, and flexibility often outweigh these expenses. It also allows specialized maintenance and upgrades for each system type.

Modern Trends and the Future of System Separation

With technological advancements, some organizations are moving toward integrated systems using data warehouses and data lakes that combine operational and informational data in a unified platform. However, even in such integrated environments, logical separation or layered architecture is often maintained to optimize performance and security.

Emerging trends include:

- Cloud-based data warehouses that serve both operational and analytical needs
- Real-time analytics platforms that process operational data on the fly
- Use of microservices architecture to modularize system functionalities

Despite these innovations, the core rationale for separating operational and informational systems remains relevant, especially concerning data security, performance, and organizational control.

Conclusion

The separation of operational and informational systems is a strategic decision rooted in multiple fundamental factors. These include differing objectives, data security concerns, performance optimization, processing requirements, flexibility needs, and regulatory compliance. By maintaining distinct systems, organizations can ensure that their daily operations run efficiently and securely while still gaining valuable insights for strategic decision-making.

Understanding these reasons helps organizations design robust, secure, and scalable information systems architecture that supports their business goals effectively. As technology continues to evolve, the principles behind system separation will adapt, but the core factors driving this separation are likely to remain relevant for years to come.

Keywords: Operational Systems, Informational Systems, Transaction Processing Systems, Management Information Systems, Data Security, System Separation, Business Intelligence, IT Infrastructure, Data Management, Organizational Efficiency

Frequently Asked Questions

Why are operational and informational systems generally separated in organizations?

They are separated to optimize performance, security, and data management by addressing different processing needs and risk levels.

What is a primary reason for the separation of operational and informational systems?

To ensure operational systems handle real-time transactions efficiently, while informational systems focus on data analysis and reporting without impacting operational performance.

How does the separation of operational and informational systems benefit organizations?

It allows each system to be optimized for its specific purpose, improving overall efficiency, security, and decision-making capabilities.

Which factor primarily influences the separation of operational and informational systems?

The need to balance real-time data processing with analytical processing to prevent system overloads and security issues.

What is a common challenge addressed by separating operational and informational systems?

Preventing operational system overloads caused by heavy analytical processing and ensuring data security.

In terms of architecture, why are operational and informational systems kept apart?

To isolate transaction processing from analytical processing, which have different performance and security requirements.

How does system separation impact data security in organizations?

It enhances security by limiting access and reducing the risk of sensitive operational data exposure during analytical processing.

What factors related to data processing necessitate the separation of operational and informational systems?

Differences in processing speed, data volume, and security requirements for real-time transactions versus data analysis.

Which of the following factors is most relevant to the separation of operational and informational systems?

The distinct functional requirements of handling daily transactions versus conducting strategic data analysis.

Additional Resources

Operational and Informational Systems Are Generally Separated Because Of Which Of The Following Factors?

In the realm of business information systems, one of the most fundamental distinctions made is between operational systems and informational systems. These two categories serve different purposes within an organization, and understanding why they are generally separated is crucial for effective system design, management, and strategic planning. The separation is often driven by specific factors that address the unique requirements, constraints, and objectives associated with each system type. This article explores these factors comprehensively, providing insights into their roles, advantages, and limitations.

Understanding Operational and Informational Systems

Before diving into the factors that cause their separation, it's essential to clarify what operational and informational systems are.

Operational Systems

Operational systems, also known as transaction processing systems (TPS), are designed to support the core day-to-day activities of an organization. They handle routine transactions such as order processing, payroll, inventory management, and customer billing. These systems are characterized by:

- High volume of transactions
- Real-time processing
- Emphasis on accuracy and reliability
- Focus on operational efficiency

Informational Systems

Informational systems, often referred to as management information systems (MIS) or decision support systems (DSS), are used to analyze, interpret, and generate reports from the data collected by operational systems. They assist managers in making strategic decisions by providing summarized, historical, and analytical information. Their features include:

- Data analysis and reporting
- Support for decision-making
- Focus on strategic insight
- Handling of aggregated and summarized data

Primary Factors Leading to the Separation of Operational and Informational Systems

The separation of these systems is rooted in various factors that address their differing roles, technical requirements, and organizational impacts.

1. Different Data Processing Needs

Operational and informational systems process data at different levels of detail and for different purposes.

- Operational Systems
 - Process detailed, transactional data in real-time
 - Focus on accuracy and consistency at the individual transaction level
 - Require high-speed data entry and processing capabilities
- Informational Systems
 - Use summarized, aggregated, or historical data
 - Focus on data analysis, forecasting, and trend identification
 - Do not require real-time updates but rely on batch processing or periodic updates

Pros of separation:

- Ensures that transaction processing is optimized for speed and accuracy
- Facilitates analytical processing without interfering with operational efficiency

Cons:

- Data silos may develop if integration is not managed properly
- Potential delays in data updates can impact decision-making timeliness

2. Different System Objectives and Priorities

Operational systems prioritize efficiency, reliability, and error-free processing to keep business functions running smoothly. Informational systems prioritize insights, strategic analysis, and supporting managerial decisions.

- Operational Systems
 - Minimize transaction errors
 - Maximize throughput and uptime
- Informational Systems
 - Maximize analytical accuracy
 - Provide meaningful reports and visualizations

Features:

- Operational systems are designed for robustness and speed.
- Informational systems are designed for flexibility and depth of analysis.

Pros:

- Clear focus improves system performance and usability for specific tasks
- Helps organizations allocate resources effectively

Cons:

- Divergence can cause disjointed views of data if integration is not seamless

3. Technical and Hardware Requirements

The technical infrastructure for operational and informational systems differs significantly.

- Operational Systems
 - Require high-performance, real-time processing hardware
 - Often utilize online transaction processing (OLTP) systems
 - Emphasize data integrity and concurrency control
- Informational Systems
 - Rely on data warehouses or data marts
 - Utilize online analytical processing (OLAP) tools
 - Focus on complex queries, data modeling, and analysis

Pros of separation:

- Optimizes hardware and software for each system's specific demands
- Prevents performance bottlenecks caused by conflicting processing needs

Cons:

- Increased infrastructure complexity and cost
- Need for robust data integration mechanisms

4. Data Security and Privacy Concerns

Different data sensitivity levels and access controls necessitate separation.

- Operational Systems
 - Store sensitive transactional data (e.g., financial details, personal information)
 - Require strict access controls to prevent fraud and data breaches
- Informational Systems
 - Contain summarized or anonymized data for analysis
 - May be accessed by a broader range of users, including analysts and managers

Features:

- Separation allows tailored security policies
- Ensures compliance with privacy regulations

Pros:

- Reduces risk of data leaks or misuse
- Facilitates compliance and audit processes

Cons:

- May complicate data sharing and integration efforts

5. Organizational and Management Factors

The organizational structure and management focus influence the separation.

- Operational Focus
 - Grounded in routine, transactional activities
 - Managed by operational staff and front-line employees
- Strategic Focus
 - Driven by managerial and executive decision-makers
 - Relies on analytical insights derived from informational systems

Features:

- Separation allows specialized management of each system type
- Promotes focus on their respective objectives

Pros:

- Enhances decision quality and operational efficiency
- Clarifies roles and responsibilities

Cons:

- Risk of siloed thinking and communication gaps

Advantages of Separating Operational and Informational Systems

- Specialization: Systems can be tailored to their specific tasks, improving efficiency and effectiveness.
- Performance Optimization: Operational systems can be optimized for speed and reliability without being bogged down by analytical processing loads.
- Data Security: Sensitive transactional data is protected through dedicated security protocols.
- Scalability: Each system can be scaled independently based on unique growth or complexity needs.
- Improved Decision-Making: Clear separation ensures that analytical insights are based on processed, reliable data without impacting transaction processing.

Disadvantages and Challenges of Separation

- Data Silos: Separation can lead to fragmented data, making comprehensive analysis more difficult unless integrated effectively.
- Cost: Maintaining multiple systems increases infrastructure, licensing, and management costs.
- Complex Data Integration: Ensuring consistency and synchronization between systems requires sophisticated ETL (Extract, Transform, Load) processes.
- Delayed Data Availability: Non-real-time data transfer can result in outdated information in informational systems.
- Organizational Silos: Separation might reinforce organizational silos, hindering communication and collaboration.

Conclusion

The separation of operational and informational systems is primarily driven by the fundamental differences in their processing needs, objectives, technical requirements, security considerations, and organizational roles. While this separation offers numerous benefits—such as optimized performance, enhanced security, and specialized functionalities—it also introduces challenges related to data integration, cost, and organizational coherence.

Effective management of these systems involves understanding the factors behind their separation and implementing strategies for seamless integration, such as data warehouses, middleware, or enterprise-wide data governance frameworks. As organizations continue to evolve in the digital age, striking the right balance between separation and integration remains critical for leveraging the full potential of their information systems infrastructure.

By recognizing the reasons behind their separation, organizations can design more resilient, efficient, and insightful systems that support both operational excellence and strategic decision-making.

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