

RANGOLI KITCHEN'S DATA- DELIVERY JOURNEY

REVOLUTIONIZING TIFFIN SERVICES



Rangoli Kitchen

Delicious food



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Introduction

Rangoli Kitchen, located in Calgary, is a modern culinary service offering tiffin services, takeouts, home delivery, and customizable meal plans. Combining authentic flavors with cutting-edge technology, we aim to redefine the food delivery experience. Our innovative approach integrates real-time data and advanced cloud architecture, allowing us to streamline operations, optimize resources, and personalize customer interactions. This article explores how our state-of-the-art data systems support our mission to deliver fresh, high-quality meals efficiently while aligning with our vision to become Calgary's leading tiffin service. By leveraging tools like Azure Event Hubs, Delta Lake, and Power BI, Rangoli Kitchen ensures seamless service, customer satisfaction, and scalability. Discover how we blend tradition with technology to create a unique and delightful dining experience.

Mission

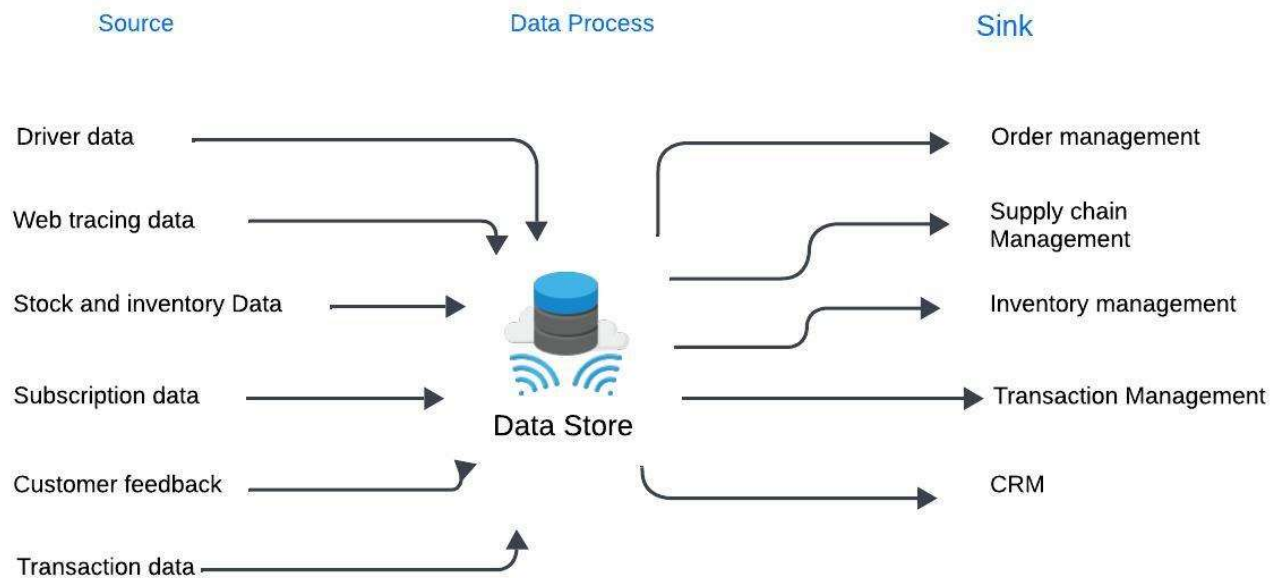
Our mission is clear: to deliver fresh, high-quality meals to your doorstep with care and efficiency. By accommodating diverse dietary preferences and providing excellent service, we aim to make every customer happy.

Vision

Within five years, Rangoli Kitchen aspires to become Calgary's leading tiffin service, renowned for flavorful food and reliable doorstep delivery. Our journey is fueled by technology and customer-centric values.

Source-Process-Sink Diagram

The **Source-Process-Sink** diagram is crucial for understanding and optimizing the flow of data within Rangoli Kitchen's operations. It simplifies complex processes by visually representing how data is collected, processed, and delivered, making it easier for both technical and non-technical stakeholders to comprehend. This clarity ensures that each team member understands their role in the pipeline and highlights inefficiencies or bottlenecks, enabling timely optimizations. Moreover, the diagram acts as a blueprint for scalability, providing a clear structure for expanding resources as the business grows. It also facilitates effective communication during stakeholder presentations and assists in onboarding new team members by offering a quick overview of the system. Additionally, the diagram supports performance monitoring by outlining key stages, ensuring smooth data flow and system efficiency. As Rangoli Kitchen evolves, this diagram will serve as a guide for integrating new technologies while maintaining operational integrity, ultimately enhancing the company's ability to deliver exceptional customer experiences.



Source-Process-Sink Diagram

This flow ensures data moves smoothly from collection to actionable insights, enabling Rangoli Kitchen to deliver exceptional service and optimize its operations effectively.

Data Source

Rangoli Kitchen collects and processes data from a variety of structured and non-structured sources. These data sources enable the business to streamline operations, enhance customer experiences, and make informed decisions. Key data sources include:

- **Driver Data:** Structured data

Driver data for Rangoli Kitchen includes information about delivery personnel, their real-time location, assigned routes, and delivery performance. This data ensures timely and efficient food delivery while minimizing delays. Using tools like Google Maps API, the system can optimize routes for faster service, enhancing the customer experience and reducing operational costs.

- **Web Tracing Data:** Non-structured data

Web tracing data for Rangoli Kitchen captures user interactions on the online ordering platform, including page views, menu item clicks, time spent browsing, and abandoned carts. By analyzing this data, Rangoli Kitchen can identify popular dishes, optimize the user interface, and streamline the ordering process to improve conversions and customer satisfaction.

- **Stock and Inventory Data:** Structured data

Stock and inventory data track the availability of ingredients and packaging materials in real time. For Rangoli Kitchen, this ensures that popular dishes are always available, reduces

wastage, and allows proactive restocking to avoid disruptions. Real-time updates enable seamless kitchen operations, supporting the preparation of meals on demand.

- **Subscription Data:** Structured data

Subscription data for Rangoli Kitchen captures customer details, such as recurring meal plans, dietary preferences, and payment schedules. This helps create flexible subscription models tailored to customer needs, offering weekly or monthly meal deliveries. Personalized menu options based on subscription data improve customer retention and satisfaction.

- **Customer Feedback:** Non-structured data

Customer feedback collected through reviews, ratings, and surveys provides insights into food quality, delivery efficiency, and service satisfaction. For Rangoli Kitchen, this data helps refine menu offerings, improve packaging, and address customer concerns promptly. Positive feedback can be shown to attract new customers, while negative feedback is used for operational improvements.

- **Transaction Data:** Structured data

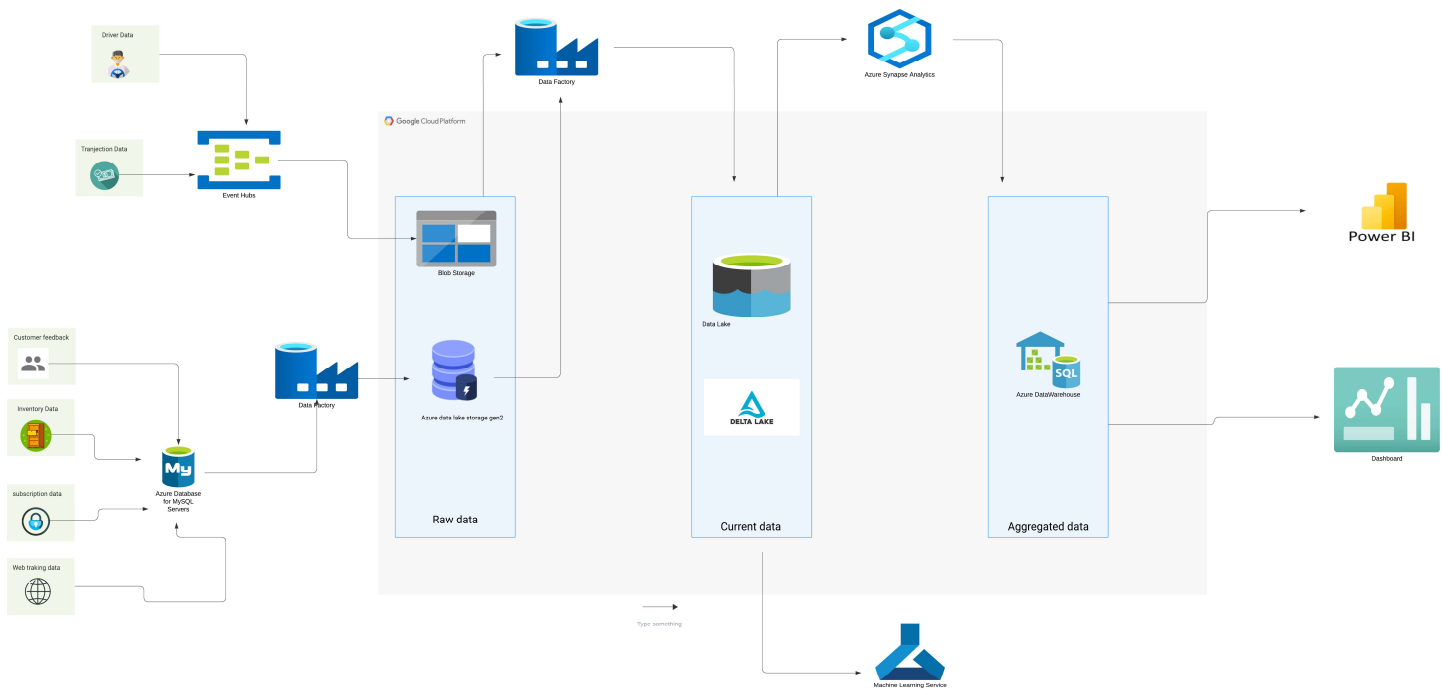
Transaction data records all financial interactions, including order payments, refunds, discounts, and tips. Rangoli Kitchen uses this data to manage invoices, receipts, and real-time tracking of revenue. It supports multiple payment methods such as cards, UPI, and PayPal, ensuring convenience for customers and transparency in billing.

Data Process

Cloud Architecture for Rangoli Kitchen

The cloud architecture chart is a vital tool for understanding and managing the complete data flow within Rangoli Kitchen's operations. It provides a clear, visual representation of how data is collected from multiple sources, processed efficiently, stored securely, and ultimately utilized to drive business decisions. This chart simplifies complex processes, making it easier for technical teams, stakeholders, and decision-makers to align their efforts. By breaking down each stage—data sources, processing tools, and storage solutions—it enables teams to identify bottlenecks, optimize workflows, and ensure seamless integration between components.

The chart's importance extends to scalability and future planning. As Rangoli Kitchen grows, this architecture serves as a roadmap to expand resources, integrate advanced technologies, and handle increasing data volumes without disruption. It also aids in performance monitoring, ensuring that real-time data flows are optimized for speed and reliability. Moreover, the chart acts as an excellent onboarding resource for new team members and a communication tool for presenting technical processes to stakeholders. Ultimately, it empowers Rangoli Kitchen to make informed, data-driven decisions, enhancing operational efficiency and customer satisfaction.



Cloud Architecture

The cloud architecture for Rangoli Kitchen is designed to streamline operations, deliver personalized customer experiences, and support future growth. It integrates various tools and services to ensure real-time data processing, accurate analytics, and effective decision-making. Below is an in-depth explanation of each component and its role in the data flow process:

I. Inputs

Data is continuously generated from multiple sources, capturing vital information that drives Rangoli Kitchen's operations. These sources include:

- **Driver Data:** Provides real-time updates on driver locations, delivery statuses, and routes.
- **Transaction Data:** Tracks customer orders, payments, and delivery preferences.
- **Customer Feedback:** Collects reviews, ratings, and suggestions to improve customer satisfaction and personalize services.
- **Inventory Data:** Monitors stock levels, ensuring timely restocking and seamless kitchen operations.
- **Subscription Data:** Manages recurring orders and subscription plans for regular customers.
- **Web Tracking Data:** Tracks customer interactions on the website, providing insights into browsing behavior and popular menu items.

Tools Used:

- **Azure Event Hubs:** Handles real-time data streams like driver and transaction data.

- **Azure Database for MySQL Servers:** Stores structured data, such as customer feedback, inventory, and subscriptions.

2. Raw Data Storage (Data Ingestion and Storage)

After data is collected, it is securely ingested into storage systems where it is prepared for further processing. This phase ensures that all raw data is stored and organized for transformation.

- **Blob Storage:** Stores unstructured data, such as logs and files that don't require immediate processing.
- **Azure Data Lake Storage Gen2:** A scalable, high-performance solution for storing both structured and unstructured data in its raw format.

3. Data Processing (Current Data)

Once the data is ingested, it moves to the processing phase, where it is cleaned, transformed, and made ready for analysis.

- **Delta Lake:** Ensures data consistency with ACID transactions, managing tasks like deduplication and merging datasets. This guarantees the reliability of the data during processing.
- **Azure Synapse Analytics:** Executes data transformations (e.g., aggregations and filtering) to extract actionable insights, optimizing the data for use in analytics and downstream applications.

4. Aggregated Data

Processed data is then stored and delivered to applications that enable business insights and operations.

- **Azure Data Warehouse:** Stores aggregated and structured data that is optimized for querying and reporting.
- **Power BI Dashboards:** Visualizes key performance indicators (KPIs), such as delivery times, customer satisfaction, and order trends, enabling decision-makers to gain actionable insights.

5. Advanced Applications

Processed data is also leveraged by advanced applications that further optimize Rangoli Kitchen's operations.

- **Machine Learning Workspaces:** Utilizes the processed data to train predictive models that help with demand forecasting, delivery optimization, and personalized meal recommendations.

Data Flow Process

Here's how data flows through the system:

1. **Data Ingestion:** Data from drivers, customers, and internal systems is streamed into **Event Hubs** or stored in **MySQL Servers**.
2. **Raw Storage:** The data is ingested into either **Blob Storage** or **Azure Data Lake Storage Gen2**, depending on its format and usage.

3. **Data Processing:** **Delta Lake** ensures data reliability while transforming it for analytics, and **Azure Synapse Analytics** processes the data into actionable insights.
4. **Aggregation and Visualization:** The processed data is stored in the **Data Warehouse**, where it feeds into **Power BI Dashboards** and machine learning applications.
5. **Insights Delivery:** Dashboards provide decision-makers with real-time insights, while APIs deliver operational data to systems such as delivery tracking.

Why This Architecture is Essential for Rangoli Kitchen

- **Efficiency:** Automates data collection, processing, and reporting, reducing manual work and streamlining operations.
- **Scalability:** Handles increasing data volumes as Rangoli Kitchen grows, ensuring smooth expansion.
- **Enhanced Customer Experience:** Real-time insights enable faster deliveries, improved inventory management, and personalized meal recommendations.
- **Data Reliability:** Ensures data accuracy through tools like **Delta Lake**, avoiding issues such as data duplication.
- **Future-Ready:** Integrates seamlessly with machine learning models to support predictive analytics and strategic planning for long-term growth.

This cloud architecture provides Rangoli Kitchen with a robust, scalable foundation to meet customer needs, optimize operations, and scale as the business grows. It positions Rangoli Kitchen for continued success and innovation in a competitive market.

Data Sinks

The data sinks in Rangoli Kitchen's architecture are the systems and tools where processed data is stored or consumed for actionable insights and operations. Below are the key data sinks and their functions:

- **Order Management:** Order management at Rangoli Kitchen tracks each order from placement to delivery. The system ensures accurate order processing, provides real-time updates to customers, and handles simultaneous orders efficiently. Integration with delivery tracking allows customers to monitor their food delivery status, enhancing trust and reliability.
- **Supply Chain Management:** Supply chain management ensures a steady flow of raw materials like vegetables, spices, and packaging supplies for Rangoli Kitchen. By analyzing inventory and order trends, it enables timely procurement and minimizes the risk of stockouts. This ensures that the kitchen operates smoothly and fulfills customer orders without delays.
- **Inventory Management:** Inventory management tracks stock levels of ingredients and packaging in real time for Rangoli Kitchen. It alerts the team about low-stock items, allowing them to restock before running out. This ensures that meals are prepared without interruptions, reduces wastage, and supports accurate forecasting for future demand.

- **Transaction Management:** Transaction management at Rangoli Kitchen oversees payments, ensures secure processing, and applies dynamic pricing based on discounts, taxes, and delivery fees. It provides detailed receipts and invoices to customers, enabling financial transparency. Integration with payment gateways like Stripe or PayPal ensures a seamless checkout process.
- **CRM (Customer Relationship Management):** The CRM system for Rangoli Kitchen centralizes customer interactions, including order history, preferences, feedback, and communication logs. This helps the team provide personalized service, recommend meals based on past orders, and retain customers through loyalty programs and targeted promotions. A well-implemented CRM enhances customer satisfaction and fosters long-term relationships

Strategy for Handling Pipeline Failures

To maintain uninterrupted operations, Rangoli Kitchen follows a robust failure strategy, ensuring seamless data processing and delivery. Here's an expanded explanation of each component of the strategy:

1. **Automated Failover:** In the event of a failure, secondary pipelines (backup systems) are automatically activated to take over the failed pipeline's tasks. This ensures that even during system interruptions, the data flow continues without disruption, maintaining the integrity of operations. For example, if a primary data ingestion system fails, a backup system instantly takes over, ensuring no data loss or delay in service.
2. **Monitoring and Alerts:** Using tools like **Azure Monitor** and **Log Analytics**, the system continuously tracks the health of every component of the pipeline. These tools are configured to detect anomalies, such as unexpected delays or errors in data processing. When an issue is identified, instant notifications are sent to the operations team, allowing them to take corrective action before the issue affects customer service or the overall flow of data.
3. **Retry Mechanisms:** When errors or failures occur in a data processing step, the system is equipped with automated retry mechanisms. These mechanisms automatically attempt to rerun the failed process, either immediately or after a specified delay, to resolve the issue. If the error persists, the system will escalate the issue to the technical team for a more detailed investigation. This reduces the risk of data loss and ensures that once the error is corrected, the system can resume its normal operation.
4. **Comprehensive Testing:** Regular audits and testing of the entire data pipeline ensure that potential issues, such as performance bottlenecks or system vulnerabilities, are identified proactively. By conducting load testing, stress testing, and failure simulations, Rangoli Kitchen can pinpoint weaknesses before they cause real disruptions. This helps optimize the pipeline's performance, ensuring smooth data flow even under high demand and growth.

By combining these strategies, Rangoli Kitchen ensures that data flows reliably, operations remain unaffected by technical issues, and the customer experience is never compromised, even during failures.

Conclusion

In conclusion, Rangoli Kitchen's innovative approach to tiffin services combines traditional culinary excellence with advanced data-driven technologies. By leveraging cutting-edge cloud architecture, real-time data processing, and strategic tools like Azure Event Hubs, Delta Lake, and Power BI, Rangoli Kitchen ensures efficient operations, personalized customer experiences, and scalability. The seamless integration of diverse data sources, such as driver, inventory, customer feedback, and transaction data, enhances decision-making and operational efficiency. Additionally, Rangoli Kitchen's robust failure management strategy, including automated failover, monitoring, retry mechanisms, and comprehensive testing, guarantees uninterrupted service and data flow, minimizing disruptions and ensuring customer satisfaction. As the company continues to grow, its technology-driven infrastructure will enable it to adapt to increasing demands, optimize resources, and stay ahead in the competitive tiffin service market. Rangoli Kitchen is poised to redefine the food delivery experience in Calgary with its fusion of tradition and innovation.