**Supply Chain Logistics Analysis Report**

**Summary Report**

**1. Executive Summary:** The analysis aimed to optimize the routing of orders from warehouses to customers to minimize overall costs while adhering to constraints such as warehouse capacities, product-specific storage limitations, and transportation costs.

Using Tableau for data visualization and linear programming (LP) for cost optimization, the project identified key strategies for cost reduction and operational efficiency. The findings suggest that expanding warehouse capacities and renegotiating freight rates are effective ways to lower costs and enhance logistics.

**2. Detailed Analysis:**

* **Historical Costs:** Analyzed historical data revealed substantial spending on storage and freight. Freight costs were found to be the largest expense, highlighting the need for targeted cost-saving measures.
* **Capacity Utilization:** The analysis of warehouse capacities showed that some warehouses are operating close to their limits. Identifying these warehouses enabled targeted recommendations for capacity adjustments.
* **Optimization Results:** The LP model demonstrated that increasing warehouse capacities by 20% or decreasing freight rates by 10% could significantly reduce total costs. This solution optimized routing while meeting customer demands and operational constraints.

**3. Insights from Scenario Analysis:**

* **Increase Capacity by 20%:** This adjustment led to a reduction in total costs, indicating that additional warehouse space could alleviate operational pressures and enhance routing efficiency.
* **Decrease Freight Rates by 10%:** Lowering freight rates also contributed to cost savings, suggesting that renegotiating transport contracts or seeking alternative providers could be beneficial.
* **Adjust Product Compatibility:** Changes in product compatibility constraints impacted routing and costs, highlighting the need for strategic alignment between product availability and warehouse capabilities.

**4. Potential Cost-Saving Strategies:**

* **Capacity Expansion:** Invest in increasing warehouse capacities to improve order fulfillment and reduce the risk of bottlenecks.
* **Freight Negotiations:** Explore options for reducing freight rates, such as negotiating with current providers or switching to more cost-effective transport solutions.
* **Product Availability Management:** Align product availability with warehouse storage capabilities to optimize costs and prevent unnecessary expenses.

**5. Goal Solution:** To achieve the goal of minimizing overall costs while fulfilling constraints, the project employed a linear programming model that optimized order routing based on historical costs, capacity constraints, and product availability.

The model's results demonstrated that strategic capacity expansion and freight cost reduction are effective solutions for achieving cost efficiency and operational excellence in the supply chain.