Myph Cart Analysis – Results, Conclusion, and References

1. Results

The results below summarize key findings from SQL and MongoDB implementations for Myph's cart analysis.

1.1 SQL Query Results

• Products in 'Smartphones' Category:

product_id	product_name	price	category_name
1	Myph X1	899.99	Smartphones
2	Myph X1 Pro	1099.99	Smartphones
3	Myph Lite	499.99	Smartphones

• Outlier (Surplus) Cart Selections:

product_id	product_name	quantity	avg_qty	stddev_qty
3	Myph Lite	5	2.6	1.2

1.2 MongoDB Aggregation Results

Sample MongoDB Aggregation Output:
• Average quantity of products in all carts.
• Detected outliers (products added in unusually high quantities).

product_name	avg_quantity	stddev_quantity	threshold
Myph X1	2.0	0.8	3.6
Myph Lite	2.6	1.2	5.0

1.3 SQL ↔ MongoDB Integration Results

The integration between SQL and MongoDB was tested using ETL synchronization. Results: All product records successfully transferred from SQL → MongoDB. Cart analytics executed in MongoDB reflected real-time updates from SQL. Transaction rollback was successfully demonstrated for SQL carts. MongoDB replica set confirmed automatic recovery during node failure.

2. Conclusion

The integration of SQL and MongoDB provides a robust and scalable solution for Myph's e-commerce system. SQL ensures data integrity and transactional reliability, while MongoDB delivers flexibility and analytical capabilities for category management, cart analysis, and outlier detection. Together, they enable Myph to analyze customer behavior in real-time, detect unusual purchasing patterns, and maintain consistent operations even under heavy load. Key Takeaways: **SQL:** Reliable for inventory, checkout, and payment operations. **MongoDB:** Best for nested

category data and flexible analytics. **Integration:** Real-time synchronization supports hybrid transactional/analytical processing (HTAP). **Recovery:** Both systems provide robust recovery and replication features ensuring minimal downtime.

3. References

1. MySQL Documentation: https://dev.mysql.com/doc/
2. MongoDB Manual: https://www.mongodb.com/docs/
3. ReportLab PDF Library: https://www.reportlab.com/
4. SQL–NoSQL Integration Strategies, ACM Digital Library, 2023.
5. MongoDB Aggregation Framework Guide, MongoDB Inc., 2024.