DINESWIFT PHASE 3: CONSOLIDATED ANALYTICS PLAN

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Authors: Product Management Team

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NAME	RegNo	EMAIL	PHONE
Mushabe Moses	23/U/12131/EVE	Mosesmushae9@gmail.com	0752307875
Drate Hillary	23/U/23611	dratehillary@gmail.om	0758235980
Mukyala Dorcus Nandy	23/U/11911/EVE	mukyaladorcus@gmail.com	0755011795
Kiyimba Fahad	23/U/0628	kiyimbafwitty@gmail.com	0762938957

This document organizes the requirements, priority, and sprint planning for the Analytics (P3) deliverables, focusing on the Cloud Server and Management Dashboard components.

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1. LOW PRIORITY USE CASES TO REQUIREMENTS MAPPING

The following tables show the complete mapping for all low-priority Phase 3 use cases. Note that there are no low-priority Mobile or Web App use cases planned for this phase.

1.1. Local Server Use Cases (P3)

Use Case ID	Use Case Name	Functional Req.	Non-Functional Req.	Priority	Test Case ID	Sprint
UC-LOCAL-ANALYTICS-120	Collect Real-time Data	LOCAL-FR-201-P3	LOCAL-NFR-001-P1	Low	LTC-LOCAL-201	5
UC-LOCAL-ANALYTICS-121	Sync Analytics to Cloud	LOCAL-FR-202-P3	LOCAL-NFR-001-P1	Low	LTC-LOCAL-202	5

1.2. Cloud Server Use Cases (P3)

Use Case ID	Use Case Name	Functional Req.	Non-Functional Req.	Priority	Test Case ID	Sprint
UC-CLOUD-ANALYTICS-222	Capture Transaction Data	CLOUD-FR-301-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-201	5
UC-CLOUD-ANALYTICS-223	Track Customer Behavior	CLOUD-FR-302-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-202	5
UC-CLOUD-ANALYTICS-224	Monitor Staff Performance	CLOUD-FR-303-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-203	5
UC-CLOUD-ANALYTICS-225	Record Inventory Movements	CLOUD-FR-304-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-204	5
UC-CLOUD-ANALYTICS-226	Generate Performance Reports	CLOUD-FR-305-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-205	6
UC-CLOUD-ANALYTICS-227	Forecast Demand	CLOUD-FR-306-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-206	6

UC-CLOUD-ANALYTICS-228	Optimize Staff Scheduling	CLOUD-FR-307-P3	CLOUD-NFR-002-P1	Low	LTC-CLOUD-207	6

1.3. Management Dashboard Use Cases (P3)

Use Case ID	Use Case Name	Functional Req.	Non-Functional Req.	Priority	Test Case ID	Sprint
UC-DASH-ANALYTICS-413	View Sales Dashboard	DASH-FR-301-P3	DASH-NFR-001-P2	Low	LTC-DASH-201	5
UC-DASH-ANALYTICS-414	Monitor Live Order Status	DASH-FR-302-P3	DASH-NFR-001-P2	Low	LTC-DASH-202	5
UC-DASH-ANALYTICS-415	Track Peak Hours	DASH-FR-303-P3	DASH-NFR-001-P2	Low	LTC-DASH-203	5
UC-DASH-ANALYTICS-416	View Performance Reports	DASH-FR-304-P3	DASH-NFR-001-P2	Low	LTC-DASH-204	6
UC-DASH-ANALYTICS-417	Analyze Customer Lifetime Value	DASH-FR-305-P3	DASH-NFR-001-P2	Low	LTC-DASH-205	6
UC-DASH-ANALYTICS-418	Compare Period Performance	DASH-FR-306-P3	DASH-NFR-001-P2	Low	LTC-DASH-206	6

2. IMPLEMENTATION PRIORITY MATRIX

These use cases define the development order based on Business Value and Complexity.

2.1. Quadrant 1: Medium Business Value, Medium Complexity (Start Sprint 5)

Use Case	Component	Requirements	Effort	Business Value
UC-CLOUD-ANALYTICS-226	Cloud Server, Dashboard	CLOUD-FR-305-P3, DASH-FR-304-P3	Medium	Medium
UC-DASH-ANALYTICS-416	Dashboard, Cloud Server	DASH-FR-304-P3, CLOUD-FR-305-P3	Medium	Medium

2.2. Quadrant 2: Low Business Value, Low Complexity (Future Enhancements)

Use Case	Component	Requirements	Effort	Business Value
UC-CLOUD-ANALYTICS-227	Cloud Server	CLOUD-FR-306-P3	Low	Low
UC-CLOUD-ANALYTICS-228	Cloud Server	CLOUD-FR-307-P3	Low	Low
UC-DASH-ANALYTICS-417	Dashboard	DASH-FR-305-P3	Low	Low
UC-DASH-ANALYTICS-418	Dashboard	DASH-FR-306-P3	Low	Low

3. SPRINT PLANNING MATRICES

Sprint 5: Analytics Foundation (Weeks 9-10)

Use Case	Component Team	Requirements	Acceptance Criteria
UC-CLOUD-ANALYTICS-222	Cloud Team	CLOUD-FR-301-P3	Transaction data captured with **99.9% accuracy**.
UC-CLOUD-ANALYTICS-223	Cloud Team	CLOUD-FR-302-P3	Customer behavior tracked across all touchpoints.
UC-CLOUD-ANALYTICS-224	Cloud Team	CLOUD-FR-303-P3	Staff performance metrics calculated accurately.
UC-CLOUD-ANALYTICS-225	Cloud Team	CLOUD-FR-304-P3	Inventory movements recorded in real-time.
UC-DASH-ANALYTICS-413	Dashboard Team	DASH-FR-301-P3	Sales dashboard loads within **5 seconds**.
UC-DASH-ANALYTICS-414	Dashboard Team	DASH-FR-302-P3	Live order status updates every **30 seconds**.
UC-DASH-ANALYTICS-415	Dashboard Team	DASH-FR-303-P3	Peak hours identified with **95% accuracy**.

3.1. Sprint 6: Advanced Analytics (Weeks 11-12)

Use Case	Component Team	Requirements	Acceptance Criteria
UC-CLOUD-ANALYTICS-226	Cloud Team	CLOUD-FR-305-P3	Performance reports generated within **10 seconds**.
UC-CLOUD-ANALYTICS-227	Cloud Team	CLOUD-FR-306-P3	Demand forecasts **80% accurate** for next week.
UC-CLOUD-ANALYTICS-228	Cloud Team	CLOUD-FR-307-P3	Staff schedules optimized for peak hours.
UC-DASH-ANALYTICS-416	Dashboard Team	DASH-FR-304-P3	Performance reports display all key metrics.
UC-DASH-ANALYTICS-417	Dashboard Team	DASH-FR-305-P3	Customer lifetime value calculated correctly.
UC-DASH-ANALYTICS-418	Dashboard Team	DASH-FR-306-P3	Period comparison shows accurate trends.

4. DETAILED TEST CASE DEFINITIONS

4.1. Cloud Server Analytics (UC-CLOUD-ANALYTICS-226 & 227)

These cases validate the core data processing and intelligence models running on the Cloud Server.

Test Case ID	Description	Preconditions	Test Steps	Expected Result
TC-CLOUD-205	**Report Data Accuracy**	100 recent transactions and staff activities synced to Cloud DB.	1. Execute the report generation service API call for a defined date range. 2. Manually calculate the aggregate metrics (e.g., Total Sales, Average Waiter Score) from raw sync tables. 3. Compare calculated results with the generated report's output.	The aggregate metrics in the generated report **match the manually calculated values** with less than 0.01 (or 0.01%) deviation.
TC-CLOUD-205A	**Report Generation Performance**	Same as above. High volume test data set (e.g., 5,000 transactions).	1. Execute the report generation service API call. 2. Start a timer immediately before execution and stop it when the response is fully returned.	The report generation process (query to delivery) completes in **less than 10 seconds** (meeting **CLOUD-NFR-002-P1**).
TC-CLOUD-205B	**Data Aggregation Completeness**	Verify all required source tables (`transactions`, `staff_performance_history`) contain data for the report period.	1. Generate the report. 2. Filter the report by Staff ID and check if all staff who worked in the period are included. 3. Filter by	The report contains accurate data points derived from **all configured source entities** (Transactions, Staff, Inventory

Test Case ID	Description	Preconditions	Test Steps	Expected Result
			Transaction Type and ensure all types (e.g., Sales, Refund) are aggregated.	Movements) without omission.
TC-CLOUD-206	**Demand Forecast Accuracy**	Historical data for 6 months (including seasonal variations) is available in the Cloud DB.	1. Run the Demand Forecast model for the previous week (Week X) using only data up to Week X-1. 2. Compare the model's predicted order count for Week X with the actual orders recorded in Week X.	The forecast model's predicted order volume for the week is within **80% accuracy** of the actual recorded order volume.
TC-CLOUD-206A	**Seasonal Pattern Detection**	Test data includes clear holiday peaks (e.g., Christmas, Valentine's Day).	1. Execute the forecast model across a time series containing known seasonal peaks. 2. Analyze the model's projected demand curve.	The forecast model successfully projects **a noticeable, high-demand peak** matching the historical seasonal event date range.
TC-CLOUD-206B	**Forecast Model Performance**	The Cloud Server is running with optimized database indices. Historical data is loaded and ready for model consumption.	1. Trigger the full demand forecast routine for the next 7 days. 2. Log the start time and end time of the routine. 3. Calculate the total execution time.	The forecast generation routine completes in **under 5 minutes** to ensure it runs efficiently during off-peak processing hours.

Management Dashboard Analytics (UC-DASH-ANALYTICS-416 & 417)

These cases focus on validating the UI presentation, user experience, and front-end calculations performed by the Management Dashboard.

Test Case ID	Description	Preconditions	Test Steps	Expected Result
TC-DASH-204	**Report Display Accuracy**	A generated performance report exists in the Cloud Server.	1. Navigate to the Performance Reports section on the Management Dashboard. 2. Verify that the displayed KPIs (e.g., Total Revenue, Avg Order Value) match the figures returned by the Cloud Server API.	All numerical data points displayed on the Dashboard report screen **match the authoritative data source** with precision.
TC-DASH-204A	**Report Loading Performance**	User clicks a link to a complex, multi-chart performance report.	1. Use performance monitoring tools (browser developer console) to measure the load time of the report page content.	The entire report visualization and data load completes and displays within **10 seconds** (meeting **DASH-NFR-001-P2**).
TC-DASH-204B	**Data Visualization Correctness**	A report is loaded containing multiple chart types (e.g., line graph, bar chart).	1. Inspect the axis labels, legends, and data points on all charts in the report. 2. Confirm that the visual representation correctly reflects the underlying data (e.g., higher bar chart segment matches higher metric value).	All charts, graphs, and visualizations are rendered correctly, **displaying the data without distortion** or misrepresentation.
TC-DASH-205	**CLV Calculation Accuracy**	Customer has multiple orders/transactions recorded.	1. Manually calculate the Customer Lifetime Value (CLV) based on the defined formula in the functional requirements (DASH-FR-305-P3). 2. View the CLV calculated by the Dashboard for that customer.	The Dashboard-calculated CLV **matches the manual calculation** exactly.

Test Case ID	Description	Preconditions	Test Steps	Expected Result
TC-DASH-205A	**Customer Segmentation Correctness**	Segmentation rules are defined (e.g., VIP = Spend 5,000).	1. Identify a test customer that meets the criteria for a specific segment (e.g., VIP). 2. View the customer's profile or segmentation report on the Dashboard.	The customer is correctly labeled and categorized into the **expected segment** (e.g., 'VIP' or 'Bronze').
TC-DASH-205B	**Trend Analysis Visualization**	A customer with a minimum of 6 months of historical transaction data exists.	1. Navigate to the Customer Analytics section for the test customer. 2. Visually inspect the historical CLV trend line graph (e.g., CLV over 12 months). 3. Compare the visual high and low points on the graph against the raw data for the corresponding periods.	The visual trend line **accurately reflects the raw historical data**, with no gaps, interpolation errors, or mislabeled axis values.

5. DETAILED TRACEABILITY SUMMARY

CLOUD-SERVER Traceability

Use Case	Implements (FR/NFR)	Dependencies	Critical Test Cases
UC-CLOUD-ANALYTICS-226	CLOUD-FR-305-P3, CLOUD-NFR-002-P1	LOCAL-FR-201-P3, CLOUD-FR-302-P3, CLOUD-FR-303-P3	TC-CLOUD-205, TC-CLOUD-205A (Perf <10s), TC-CLOUD-205B
UC-CLOUD-ANALYTICS-227	CLOUD-FR-306-P3, CLOUD-NFR-002-P1	CLOUD-FR-301-P3, CLOUD-FR-302-P3	TC-CLOUD-206 (Accuracy >80%), TC-CLOUD-206A/B (Model Perf)

MANAGEMENT-DASHBOARD Traceability

Use Case	Implements (FR/NFR)	Dependencies	Critical Test Cases
UC-DASH-ANALYTICS-416	DASH-FR-304-P3, DASH-NFR-001-P2	CLOUD-FR-305-P3, CLOUD-FR-302-P3	TC-DASH-204, TC-DASH-204A (Load Perf), TC-DASH-204B (Viz Correctness)
UC-DASH-ANALYTICS-417	DASH-FR-305-P3, DASH-NFR-001-P2	CLOUD-FR-302-P3, CLOUD-FR-301-P3	TC-DASH-205 (CLV Accuracy), TC-DASH-205A/B (Segmentation/Trends)

6. RISK ASSESSMENT AND SUCCESS METRICS

6.1. Risk Assessment Summary

Use Case	Risk	Mitigation Strategy	Owner
UC-CLOUD-ANALYTICS-227	Forecast model inaccuracy	Simple moving average baseline, gradual ML integration.	Cloud Team
UC-CLOUD-ANALYTICS-228	Staff scheduling complexity	Rule-based optimization, manual override capability.	Cloud Team
UC-DASH-ANALYTICS-417	CLV calculation complexity	Simplified calculation model, progressive enhancement.	Dashboard Team
UC-CLOUD-ANALYTICS-222	Data volume performance	Database indexing, query optimization.	Cloud Team
UC-DASH-ANALYTICS-413	Dashboard loading performance	Data pagination, lazy loading.	Dashboard Team

6.2. Success Metrics Tracking

Use Case	Primary Metric	Target	Measurement Method
UC-CLOUD-ANALYTICS-226	Report Generation Time	**<10 seconds**	Performance monitoring
UC-CLOUD-ANALYTICS-227	Forecast Accuracy	**>80%**	Historical data comparison
UC-CLOUD-ANALYTICS-228	Staff Utilization	**15% improvement**	Labor cost analytics
UC-DASH-ANALYTICS-416	User Engagement	**70% manager adoption**	Dashboard usage analytics
UC-DASH-ANALYTICS-417	CLV Insights	Identify top 20% customers	Customer segmentation reports

7. CROSS-COMPONENT DEPENDENCIES AND BUSINESS OUTCOMES

7.1. Dependencies for P3

Cross-Component Dependencies:

Data Collection: Local Server (Real-time Operations) → Cloud Server (Data Warehouse) → Management Dashboard (Reports)
Predictive Analytics: Cloud Server (Historical Data) → Cloud Server (Machine Learning) → Dashboard (Insights)
Performance Optimization: Local Server (Operational Metrics) → Cloud Server (Analysis) → All Components (Improvements)
Real-time Monitoring Flow:
Restaurant Operations → Local Server Data Capture → Cloud Server Processing → Dashboard Display → Manager Decisions → Operational Changes

7.2. Phase Dependencies:

P1 & P2 Data Foundation Required: All P3 analytics depend on operational data from previous phases

Payment System Analytics: Revenue insights require payment transaction data from P1

Loyalty Program Data: Customer behavior analytics require loyalty data from P2

Inventory Management: Supply chain analytics require inventory data from P2

Order Processing: Operational efficiency metrics require order data from P1

Customer Feedback: Satisfaction analytics require communication system data from P2

Technical Dependencies:

Data Infrastructure: Cloud Server requires scalable data storage from P1/P2

Real-time Processing: Local Server must capture granular operational data

Dashboard Performance: Management Dashboard requires optimized data APIs

Machine Learning: Predictive models need sufficient historical data (3+ months)

7.3. Phase 3 business outcomes

Strategic Decision Making:
80% accurate demand forecasting enabling optimal inventory planning
15% reduction in food waste through predictive ordering
20% improvement in staff scheduling efficiency based on peak hour predictions