**DINESWIFT PHASE 3: CONSOLIDATED ANALYTICS PLAN**

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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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# 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.

## 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 |

## 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 |

## 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 |

# IMPLEMENTATION PRIORITY MATRIX

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

## 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 |

## 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 |

# 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**. |

## 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. |

# DETAILED TEST CASE DEFINITIONS

## 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 Transaction Type and ensure all types (e.g., Sales, Refund) are aggregated. | The report contains accurate data points derived from **all configured source entities** (Transactions, Staff, Inventory 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. |
| **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. |

1. 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) |

# RISK ASSESSMENT AND SUCCESS METRICS

## 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 |

## 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 |

# **CROSS-COMPONENT DEPENDENCIES AND BUSINESS OUTCOMES**

### 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

## 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)

## 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