

# Product Requirements Document

## # Product Requirements Document: Dashboard Analytics Module

### ## 1. Overview

The Dashboard Analytics Module provides comprehensive data visualization and analytics capabilities for users to monitor key performance indicators (KPIs), track business metrics, and make data-driven decisions. This module includes real-time data updates, interactive charts, customizable widgets, and export functionality.

### ## 2. Business Objectives

- Provide real-time visibility into business performance metrics
- Enable data-driven decision making through comprehensive analytics
- Support multiple user roles with role-based data access
- Improve user engagement through interactive data visualization
- Support export of analytics data for reporting and analysis
- Display data with < 2 second load time for optimal user experience

### ## 3. Functional Requirements

#### ### 3.1 Dashboard Layout

##### \*\*FR-001:\*\* Dashboard structure:

- Header section with date range selector (Today, Last 7 days, Last 30 days, Last 90 days, Custom range)
- KPI cards section (4-6 key metrics displayed as cards)
- Chart section (multiple chart widgets, customizable layout)
- Table section (detailed data tables with sorting and filtering)
- Export section (buttons to export data in various formats)
- Refresh button (manual data refresh)
- Auto-refresh toggle (refresh every 30 seconds, 1 minute, 5 minutes, or disabled)

##### \*\*FR-002:\*\* KPI Cards:

- Display key metrics: Total Revenue, Total Orders, Average Order Value, Active Users, Conversion Rate, Customer Lifetime Value
- Each card shows:
  - Metric name
  - Current value (large, prominent)
  - Change from previous period (percentage and arrow indicator)
  - Trend indicator (up/down arrow, color-coded: green for positive, red for negative)
  - Mini sparkline chart showing trend over time
- Cards are clickable to drill down into detailed view
- Cards support tooltips with additional context

##### \*\*FR-003:\*\* Date Range Selector:

- Preset options: Today, Yesterday, Last 7 days, Last 30 days, Last 90 days, This Month, Last Month, This Year, Last Year

- Custom date range picker (calendar widget)Đ
- Time zone selector (user's local timezone or UTC)Đ
- Apply button to update dashboard with selected rangeĐ
- Display selected range in header: "Showing data for: Jan 1, 2024 - Jan 31, 2024"Đ

### ### 3.2 Charts and Visualizations

#### \*\*FR-004:\*\* Revenue Chart:

- Line chart showing revenue over timeĐ
- X-axis: Date (daily, weekly, or monthly based on date range)Đ
- Y-axis: Revenue amount (formatted as currency: \$X,XXX.XX)Đ
- Interactive tooltips showing exact values on hoverĐ
- Zoom functionality (click and drag to zoom into date range)Đ
- Legend showing different revenue streams (if applicable)Đ
- Export chart as PNG or PDFĐ

#### \*\*FR-005:\*\* Orders Chart:

- Bar chart showing number of orders over timeĐ
- X-axis: DateĐ
- Y-axis: Order countĐ
- Color-coded bars (different colors for different order statuses)Đ
- Stacked bars showing order breakdown by statusĐ
- Interactive tooltipsĐ
- Click on bar to view order details for that periodĐ

#### \*\*FR-006:\*\* User Activity Chart:

- Area chart showing active users over timeĐ
- X-axis: DateĐ
- Y-axis: User countĐ
- Stacked areas showing new users vs returning usersĐ
- Smooth curve interpolationĐ
- Interactive legend to show/hide data seriesĐ

#### \*\*FR-007:\*\* Conversion Funnel Chart:

- Funnel visualization showing conversion rates at each stageĐ
- Stages: Visitors !' Sign-ups !' Add to Cart !' Checkout !' PurchaseĐ
- Percentage conversion rate displayed at each stageĐ
- Color gradient (darker at top, lighter at bottom)Đ
- Click on stage to view detailed breakdownĐ

#### \*\*FR-008:\*\* Geographic Distribution Map:

- World map or country map showing user distributionĐ
- Color intensity based on user count or revenueĐ
- Hover to see country name and metric valueĐ
- Click to drill down into country-specific dataĐ
- Filter by region (Americas, Europe, Asia, etc.)Đ

**\*\*FR-009:\*\* Device Breakdown Chart:**

- Pie chart or donut chart showing device distribution
- Segments: Desktop, Mobile, Tablet
- Percentage and count for each segment
- Interactive: click segment to filter dashboard by device
- Color-coded segments with legend

**\*\*FR-010:\*\* Custom Chart Builder:**

- Allow users to create custom charts
- Select data source (revenue, orders, users, etc.)
- Select chart type (line, bar, pie, area, scatter)
- Select date range
- Select grouping (by day, week, month, year)
- Save custom charts for future use
- Share custom charts with team members

### ### 3.3 Data Tables

**\*\*FR-011:\*\* Orders Table:**

- Columns: Order ID, Date, Customer, Amount, Status, Payment Method, Actions
- Sortable columns (click header to sort)
- Filterable columns (text search, dropdown filters)
- Pagination (10, 25, 50, 100 rows per page)
- Row selection (checkbox) for bulk actions
- Export selected rows
- Responsive design (horizontal scroll on mobile)

**\*\*FR-012:\*\* Users Table:**

- Columns: User ID, Name, Email, Sign-up Date, Last Active, Total Orders, Total Spent, Status
- Same features as Orders Table (sort, filter, pagination, export)
- Search functionality (search across all columns)
- Advanced filters (date range, status, activity level)

**\*\*FR-013:\*\* Products Table:**

- Columns: Product ID, Name, Category, Price, Stock, Units Sold, Revenue, Status
- Same features as other tables
- Category filter (dropdown with all categories)
- Stock alert (highlight low stock items in red)

### ### 3.4 Export Functionality

**\*\*FR-014:\*\* Export Options:**

- Export to Excel (.xlsx) with formatted data and charts
- Export to PDF (.pdf) with dashboard snapshot
- Export to CSV (.csv) for raw data
- Export to JSON (.json) for API integration

- Scheduled exports (daily, weekly, monthly email reports)Đ

#### **\*\*FR-015:\*\* Export Configuration:**

- Select data to export (all data, filtered data, selected rows)Đ
- Select date range for exportĐ
- Select format (Excel, PDF, CSV, JSON)Đ
- Include charts in export (yes/no)Đ
- Email export to specified recipientsĐ

### **### 3.5 Real-time Updates**

#### **\*\*FR-016:\*\* Auto-refresh:**

- Toggle auto-refresh on/offĐ
- Refresh intervals: 30 seconds, 1 minute, 5 minutes, 15 minutesĐ
- Visual indicator when data is refreshing (spinning icon)Đ
- Notification when new data is availableĐ
- Pause auto-refresh when user is interacting with dashboardĐ

#### **\*\*FR-017:\*\* Real-time Notifications:**

- Toast notification for significant events (e.g., "New order received: \$500")Đ
- Badge on relevant KPI card showing new updatesĐ
- Sound notification (optional, user preference)Đ
- Notification center showing recent eventsĐ

### **### 3.6 Customization**

#### **\*\*FR-018:\*\* Widget Management:**

- Add/remove widgets from dashboardĐ
- Rearrange widgets (drag and drop)Đ
- Resize widgets (small, medium, large)Đ
- Save dashboard layout as defaultĐ
- Create multiple dashboard views (e.g., "Sales Dashboard", "Marketing Dashboard")Đ
- Switch between saved dashboard viewsĐ

#### **\*\*FR-019:\*\* User Preferences:**

- Default date rangeĐ
- Default refresh intervalĐ
- Chart color scheme (light, dark, custom)Đ
- Number format (US: \$1,234.56, EU: 1.234,56 €)Đ
- Time zone preferenceĐ
- Language preferenceĐ

## **## 4. Non-Functional Requirements**

### **### 4.1 Performance**

#### **\*\*NFR-001:\*\* Load time:**

- Dashboard initial load: < 2 secondsĐ
- Chart rendering: < 1 secondĐ

- Data refresh: < 3 secondsĐ
- Export generation: < 5 seconds for up to 10,000 rowsĐ

**\*\*NFR-002:\*\* Data processing:**

- Support datasets up to 1 million recordsĐ
- Efficient data aggregation and groupingĐ
- Caching of frequently accessed dataĐ
- Lazy loading for large datasetsĐ

### ### 4.2 Usability

**\*\*NFR-003:\*\* User experience:**

- Intuitive, clean interfaceĐ
- Responsive design (mobile, tablet, desktop)Đ
- Keyboard shortcuts for common actionsĐ
- Tooltips and help text for complex featuresĐ
- Onboarding tour for new usersĐ

**\*\*NFR-004:\*\* Accessibility:**

- WCAG 2.1 AA complianceĐ
- Screen reader supportĐ
- Keyboard navigationĐ
- High contrast modeĐ
- Colorblind-friendly color schemesĐ

### ### 4.3 Security

**\*\*NFR-005:\*\* Data access:**

- Role-based access control (RBAC)Đ
- Users can only see data they have permission to viewĐ
- Audit log for data accessĐ
- Data encryption in transit and at restĐ

## ## 5. User Flows

### ### 5.1 Viewing Dashboard

1. User logs into application
2. User navigates to Dashboard page
3. Dashboard loads with default date range (Last 30 days)
4. KPI cards display with current metrics
5. Charts render with data visualization
6. Tables display detailed data
7. User can interact with charts (hover, click, zoom)
8. User can filter and sort tables
9. User can change date range
10. Dashboard updates with new data

### ### 5.2 Exporting Data

1. User applies filters to dashboard data
2. User clicks "Export" button
3. Export dialog opens
4. User selects export format (Excel)
5. User selects data range (filtered data)
6. User clicks "Export" button
7. System generates export file
8. File downloads automatically
9. User receives notification: "Export completed successfully"

### ### 5.3 Customizing Dashboard

1. User clicks "Customize Dashboard" button
2. Widget selection panel opens
3. User adds new widget (Revenue Chart)
4. User drags widget to desired position
5. User resizes widget to large size
6. User removes unused widget (Device Breakdown)
7. User clicks "Save Layout"
8. Dashboard layout is saved
9. Dashboard displays with new layout

## ## 6. Technical Specifications

### ### 6.1 API Endpoints

#### **GET /api/analytics/dashboard**

- Query params: `startDate`, `endDate`, `metrics[]`Đ
- Response: `{ "kpis": [...], "charts": {...}, "tables": {...} }`Đ

#### **GET /api/analytics/revenue**

- Query params: `startDate`, `endDate`, `groupBy` (day/week/month)Đ
- Response: `{ "data": [{ "date": "2024-01-01", "revenue": 5000 }] }`Đ

#### **GET /api/analytics/export**

- Query params: `format`, `startDate`, `endDate`, `filters`Đ
- Response: File download (Excel, PDF, CSV, JSON)Đ

### ### 6.2 Data Processing

- Data aggregation using SQL queriesĐ
- Caching using Redis (5-minute TTL)Đ
- Real-time updates via WebSocket connectionĐ
- Background jobs for scheduled exportsĐ

### ### 6.3 Chart Library

- Chart.js or D3.js for data visualizationĐ
- Responsive charts that adapt to screen sizeĐ
- Export charts as images (Canvas API)Đ

## ## 7. Acceptance Criteria

1. ' Dashboard loads in < 2 seconds
2. ' All KPI cards display correct metrics
3. ' Charts render correctly with interactive features
4. ' Date range selector updates dashboard data
5. ' Tables support sorting, filtering, and pagination
6. ' Export functionality works for all formats
7. ' Auto-refresh updates data correctly
8. ' Dashboard customization (add/remove/rearrange widgets) works
9. ' Dashboard is responsive on mobile devices
10. ' Role-based data access is enforced
11. ' Real-time notifications work correctly
12. ' All performance requirements are met

## ## 8. Dependencies

- Analytics database (data warehouse)Đ
- Charting library (Chart.js or D3.js)Đ
- Export libraries (ExcelJS, PDFKit)Đ
- WebSocket server (real-time updates)Đ
- Redis (caching)Đ
- Background job processor (scheduled exports)Đ

## ## 9. Out of Scope

- Advanced predictive analytics (future enhancement)Đ
- Custom SQL query builder (future enhancement)Đ
- Machine learning insights (future enhancement)Đ
- Mobile app (web-only for now)Đ
- White-label dashboards (future enhancement)Đ

## ## 10. Testing Requirements

- Unit tests for data aggregation logicĐ
- Integration tests for API endpointsĐ
- End-to-end tests for dashboard interactionsĐ
- Performance testing (load testing with large datasets)Đ
- Cross-browser testing (Chrome, Firefox, Safari, Edge)Đ
- Mobile responsiveness testingĐ

