Business Intelligence Requirements

Digital ID Data Privacy and Access Monitoring System

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1. BUSINESS INTELLIGENCE OVERVIEW

Purpose

Enable data-driven decision-making for Digital ID privacy management through comprehensive analytics, monitoring, and reporting capabilities.

Target Users

- **Data Protection Officers (DPO)**: Compliance monitoring, violation tracking
- **System Administrators**: Performance monitoring, capacity planning
- **Executive Management**: Strategic insights, KPI dashboards
- **Audit Teams**: Historical analysis, trend identification
- **Citizens**: Personal access history, transparency reports

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2. KEY PERFORMANCE INDICATORS (KPIs)

2.1 Operational KPIs

KPI	Description	Target	Measurement
Total Active Citizens	Number of registered citizens with active status	Growing	COUNT(status='ACTIVE')
Total Access Requests	Daily/Monthly access requests	< 10,000/day	COUNT(access_requests)
Request Processing Time	Avg time from submission to approval	< 24 hours	AVG(approval_date - request_date)

Auto-Approval Rate	% of requests approved automatically	> 70%	(Auto-approved / Total) * 100
System Availability	Uptime percentage	> 99.5%	System monitoring

2.2 Security KPIs

KPI	Description	Target	Measurement
High-Risk Requests	Requests with risk score ≥ 0.7	< 5% of total	COUNT(risk_score >= 0.7)
Denial Rate	% of requests denied	< 10%	(Denied / Total) * 100
Violation Count	Number of privacy violations	0 per month	COUNT(violations)
Average Risk Score	Mean risk score across all requests	< 0.3	AVG(risk_score)
Alert Response Time	Time to resolve critical alerts	< 2 hours	AVG(reviewed_date - alert_date)

2.3 Compliance KPIs

KPI	Description	Target	Measurement
Consent Coverage	% of citizens with active consents	> 80%	(With consent / Total) * 100
Expired Consent Rate	% of consents past expiry	< 5%	(Expired / Total) * 100
Audit Log Completeness	% of requests with logs	100%	(Logged / Total) * 100
Entity Compliance Rate	% of entities following policies	> 95%	(Compliant / Total) * 100
Data Retention Compliance	Logs retained for 7 years	100%	System validation

2.4 Privacy KPIs

KPI	Description	Target	Measurement
Consent Revocation Rate	% of consents revoked by citizens	< 3%	(Revoked / Total) * 100
Unauthorized Access Attempts	Failed access attempts per day	< 50	COUNT(action_result='DENIED')
Citizen Notification Rate	% of access events with citizen alert	100%	System validation
Data Minimization Score	Avg fields accessed vs requested	< 0.8	AVG(accessed / available)

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3. DASHBOARD SPECIFICATIONS

3.1 Executive Summary Dashboard

Purpose: High-level overview for management
Refresh Frequency: Real-time (every 5 minutes)
Access Level: Executive, DPO

Components:

1. **KPI Cards (Top Row)**
   - Total Active Citizens (with % change)
   - Total Requests Today (with trend)
   - Current Risk Level (color-coded)
   - Active Violations (alert if > 0)
2. **Request Volume Chart**
   - Line chart: Last 30 days daily requests
   - Color-coded by status (Approved/Denied/Pending)
   - Annotations for anomalies
3. **Risk Distribution Pie Chart**
   - High Risk (red): ≥ 0.7
   - Moderate Risk (yellow): 0.4-0.69
   - Low Risk (green): < 0.4
4. **Top 5 Entities by Request Volume**
   - Bar chart: Horizontal bars
   - Entity name, type, request count
   - Click to drill-down
5. **Compliance Score Gauge**
   - Radial gauge: 0-100%
   - Based on: consent coverage, audit completeness, entity compliance

- Target line at 95%

3.2 Security & Risk Dashboard

Purpose: Real-time threat monitoring
Refresh Frequency: Every 1 minute
Access Level: DPO, Security Team

Components:

1. **High-Risk Requests Table**
   - Request ID, Entity, Risk Score, Status
   - Red highlight for score > 0.8
   - "Review Now" action button
2. **Risk Score Trends**
   - Line chart: Average daily risk score (30 days)
   - Moving average line (7-day)
   - Threshold line at 0.5
3. **Alert Severity Distribution**
   - Donut chart: Critical/High/Medium/Low
   - Count and percentage per severity
   - Click to view alert details
4. **Entity Risk Matrix**
   - Scatter plot: Access frequency vs Avg risk score
   - Bubble size = violation count
   - Quadrant labels (High Volume/High Risk = Danger Zone)
5. **Anomaly Detection Timeline**
   - Timeline view: Unusual patterns detected
   - Markers for: spike in requests, new entity, off-hours access
   - Drill-down to details

3.3 Compliance & Audit Dashboard

Purpose: Regulatory compliance monitoring
Refresh Frequency: Daily at 00:00
Access Level: DPO, Auditors

Components:

1. **Consent Status Overview**
   - Stacked bar chart: Granted/Revoked/Expired by month
   - Trend line: Overall consent coverage
   - Goal line at 80%
2. **Audit Log Completeness**
   - Progress bar: % of requests with complete logs
   - Must be 100% for compliance
   - List of missing logs (if any)
3. **Violation Trends**
   - Area chart: Violations by type over time
   - Stacked: Unauthorized Access, Consent Breach, Time Violation
   - Annotations for corrective actions
4. **Entity Authorization Status**

    - Table: Entity name, Status, Expiry date, Days remaining
    - Color-coding: Green (>30 days), Yellow (7-30 days), Red (<7 days)
    - Auto-sort by expiry date
5. **Data Category Access Heatmap**
    - Heatmap: Data categories (rows) vs Entities (columns)
    - Cell color intensity = access frequency
    - Identify over-accessed categories

3.4 Operational Performance Dashboard

Purpose: System health and capacity monitoring
Refresh Frequency: Every 5 minutes
Access Level: System Admin, DPO

Components:

1. **Request Processing Metrics**
    - Avg processing time: Gauge (target < 24h)
    - Request queue depth: Number
    - Oldest pending request: Age in hours
2. **Database Performance**
    - Query response time: Line chart
    - Table sizes: Bar chart (top 10 tables)
    - Index efficiency: Percentage
3. **Access Pattern Analysis**
    - Hour-of-day heatmap: Requests by hour (24h)
    - Day-of-week bar chart: Request volume
    - Identify peak times for capacity planning
4. **Citizen Engagement Metrics**
    - New registrations per day: Line chart
    - Consent grant/revoke ratio: Trend
    - Active citizens vs Total: Percentage
5. **System Alerts & Issues**
    - List: Recent errors, warnings, info
    - Status: Open/Resolved
    - Priority sorting

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4. REPORTING REQUIREMENTS

4.1 Daily Reports

Generated: Every day at 08:00
Delivered to: DPO via email

Contents:

- Yesterday's request summary (total, approved, denied)
- High-risk requests requiring review

- New violations detected
- Critical alerts generated
- Top 5 most active entities

4.2 Weekly Reports

Generated: Every Monday at 09:00
Delivered to: DPO, Security Team

Contents:

- Week-over-week request trends
- Risk score analysis
- Entity compliance status
- Consent changes (granted/revoked)
- Resolved vs open alerts

4.3 Monthly Reports

Generated: 1st day of each month at 10:00
Delivered to: Executive Management, DPO

Contents:

- Executive summary (KPI dashboard snapshot)
- Compliance scorecard
- Violation investigation outcomes
- Entity performance rankings
- Citizen satisfaction metrics (if available)
- Recommendations for improvement

4.4 Quarterly Reports

Generated: Quarterly (Jan, Apr, Jul, Oct)
Delivered to: Board of Directors, Regulatory Authority

Contents:

- Strategic KPI trends (3-month view)
- Year-over-year comparisons
- Regulatory compliance attestation
- Audit findings and remediation
- Risk assessment summary
- Budget and resource allocation

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5. ANALYTICAL QUERIES NEEDED

5.1 Trend Analysis

- Request volume trends (daily, weekly, monthly)
- Risk score evolution over time
- Consent grant/revoke patterns
- Entity access frequency changes

5.2 Comparative Analysis

- Entity performance benchmarking
- Risk score distribution by entity type
- Access patterns: Weekday vs Weekend
- Data category popularity

5.3 Predictive Analysis

- Future request volume forecasting (time series)
- Risk score prediction based on patterns
- Capacity planning: Peak load estimation
- Consent expiry prediction

5.4 Cohort Analysis

- Citizen registration cohorts (by month)
- Entity onboarding cohorts
- Retention analysis: Active vs Inactive citizens
- Consent longevity by data category

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6. DATA SOURCES & INTEGRATION

6.1 Primary Data Sources

- **CITIZENS** table: Demographics, status
- **ACCESS_REQUESTS** table: Request details, risk scores
- **ACCESS_LOGS** table: Audit trail
- **CONSENT_RECORDS** table: Consent history
- **ALERTS** table: Security events
- **VIOLATIONS** table: Compliance breaches
- **AUTHORIZED_ENTITIES** table: Entity information

6.2 Integration Points

- **Oracle BI Publisher**: Report generation
- **Tableau/Power BI**: Dashboard visualization
- **Email System**: Automated report delivery
- **SIEM Tools**: Security event correlation

- **Ticketing System**: Alert management

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7. IMPLEMENTATION APPROACH

Phase 1: Foundation (Week 1-2)

- Design dimensional model (star schema)
- Create materialized views for performance
- Develop core analytical queries
- Set up data refresh schedules

Phase 2: Dashboards (Week 3-4)

- Build Executive Summary dashboard
- Build Security & Risk dashboard
- Build Compliance & Audit dashboard
- Build Operational Performance dashboard

Phase 3: Reporting (Week 5-6)

- Configure daily/weekly/monthly reports
- Set up email delivery automation
- Create report templates
- Test report accuracy

Phase 4: Advanced Analytics (Week 7-8)

- Implement predictive models
- Configure anomaly detection
- Set up real-time alerting
- Performance tuning

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8. SUCCESS METRICS FOR BI IMPLEMENTATION

Metric	Target	Measurement Method
Dashboard Load Time	< 3 seconds	Performance testing
Report Accuracy	100%	Data validation
User Adoption Rate	> 80%	Usage analytics

Query Performance	< 5 seconds	Database monitoring
Data Freshness	< 5 minutes	Timestamp validation
User Satisfaction	> 4.0/5.0	Survey feedback

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9. TOOLS & TECHNOLOGIES

Recommended BI Stack

- **Visualization**: Tableau Desktop / Power BI
- **Reporting**: Oracle BI Publisher / Jasper Reports
- **ETL**: Oracle Data Integrator / Talend
- **Analytics**: Oracle Analytics Cloud / Python (pandas, scikit-learn)
- **Scheduling**: Oracle Scheduler / Apache Airflow
- **Monitoring**: Grafana / Prometheus

Alternative (Low-Cost)

- **Visualization**: Metabase (open-source)
- **Reporting**: HTML/CSS dashboards
- **ETL**: PL/SQL procedures
- **Analytics**: SQL analytical queries
- **Scheduling**: Oracle DBMS_SCHEDULER
- **Monitoring**: Custom SQL scripts