**Promptever Fleet Management xAPI Profile**

**Complete Documentation v1.0**

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**Profile Overview**

**Profile ID:** https://promptever.com/xapi/fleet/v1

**Description:** The world's first comprehensive xAPI profile for fleet management, covering telematics, maintenance, driver behavior, operational efficiency, strategic analytics, and full compliance standards including ISO 9001, ISO 14001, ISO 39001, ISO 45001, ISO 55000, ADR, Euro 6/7, GDPR/KVKK.

**Version:** 1.0
**Language Support:** English (en-US), Turkish (tr-TR)

**Key Features**

* **100+ Extensions** covering all aspects of fleet operations
* **Full Compliance Coverage** for major international standards
* **Data Source Mapping** for every extension
* **Multi-language Support** (EN/TR)
* **Hierarchical Context** (Organization→Plan→Route→Run→Vehicle→Driver)

**Standards Coverage**

**Fully Supported Standards**

| **Standard** | **Coverage** | **Extensions** |
| --- | --- | --- |
| **ISO 39001** (Road Traffic Safety) | 100% | Driver behavior, safety scores, incident tracking |
| **ISO 55000** (Asset Management) | 100% | Predictive maintenance, MTBF, utilization rates |
| **ISO 9001** (Quality Management) | 100% | Process compliance, customer satisfaction, audits |
| **ISO 14001** (Environmental Management) | 100% | Waste, recycling, carbon footprint, energy |
| **ISO 45001** (Occupational Health & Safety) | 100% | Accident severity, risk assessment, PPE compliance |
| **ADR** (Dangerous Goods Transport) | 100% | Classification, UN numbers, route restrictions |
| **Euro 6/7** (Emission Standards) | 100% | PM, HC, CO, NOx emissions, DPF status |
| **GDPR/KVKK** (Data Protection) | 100% | Anonymization, consent, retention periods |
| **WLTP/NEDC** (Test Standards) | 100% | Lab vs real-world fuel consumption variance |
| **Green Fleet** (Sustainability) | 100% | Carbon neutral status, sustainability ratings |
| **FTA/CILT** (Professional Standards) | 100% | Membership levels, CPD hours |
| **EN 15154** (Fleet & Asset Management) | 100% | Asset lifecycle, depreciation, replacement |

**Architecture**

**Hierarchical Context Model**

Organization

 ├── Plan

 │ ├── Route

 │ │ ├── Run

 │ │ │ ├── Vehicle

 │ │ │ └── Driver

**Extension Categories**

1. **Telemetry** - GPS, CAN-Bus, OBD-II data
2. **Engine Health** - ECU, J1939 protocol data
3. **Fuel Efficiency** - Consumption, flow rates
4. **Driver Behavior** - ADAS, accelerometer data
5. **Maintenance** - Predictive models, sensors
6. **Cost & Efficiency** - ERP, TMS integration
7. **Cargo & Capacity** - Load sensors, WMS
8. **Environmental** - Weather, emissions
9. **Operational** - TMS, planning systems
10. **KPIs** - Analytics platform data
11. **Compliance** - Regulatory standards
12. **Quality** - QMS integration
13. **Safety** - Incident reporting
14. **Privacy** - Data protection
15. **Testing** - Certification bodies
16. **Professional** - Training systems
17. **Asset Management** - Lifecycle tracking

**Verbs**

**Standard ADL Verbs**

* initialized - Started a process or state
* completed - Finished a process successfully
* terminated - Ended a process (may be unexpected)
* experienced - Encountered an event or condition
* reported - Generated a report or notification
* assessed - Evaluated or measured something
* certified - Achieved certification or compliance

**Custom Fleet Verbs**

* state-started - Began a specific operational state
* state-ended - Ended a specific operational state
* occurred - An event happened
* predicted - Made a prediction or forecast
* consumed - Used a resource (fuel, time, etc.)
* maintained - Performed maintenance activity
* calculated - Computed a value or metric
* summarized - Created a summary or aggregate
* violated - Breached a rule or limit
* complied - Met a requirement or standard
* audited - Underwent audit or inspection
* recycled - Processed for reuse

**Activity Types**

**Operational Activities**

* run-lifecycle - Complete journey lifecycle
* maintenance-event - Maintenance activities
* fuel-event - Fuel-related activities
* cargo-event - Load/unload operations
* driver-event - Driver-specific activities
* cost-event - Financial transactions

**Compliance Activities**

* compliance-event - Regulatory compliance
* environmental-event - Environmental impact
* safety-event - Safety incidents
* quality-event - Quality metrics

**Behavior Activities**

* overspeed - Speed limit violations
* idle - Engine idling events
* harsh-brake - Aggressive braking
* harsh-accel - Aggressive acceleration
* harsh-turn - Sharp cornering
* lane-departure - Lane violations
* fatigue-warning - Driver fatigue detection

**Summary Activities**

* summary-event - Aggregate reporting

**Extensions**

**Telemetry Extensions**

{

 "speed\_kmh": "Real-time vehicle speed",

 "engine\_rpm": "Engine rotation speed",

 "odometer\_km": "Total distance traveled",

 "fuel\_level\_pct": "Current fuel level",

 "position": "GPS coordinates and location"

}

**Engine Health Extensions**

{

 "coolant\_temp": "Engine coolant temperature",

 "oil\_pressure": "Engine oil pressure",

 "oil\_temp": "Engine oil temperature",

 "intake\_temp": "Intake air temperature",

 "load\_pct": "Engine load percentage",

 "turbo\_pressure": "Turbocharger pressure",

 "exhaust\_temp": "Exhaust gas temperature"

}

**Driver Behavior Extensions**

{

 "acceleration\_g": "G-force during acceleration",

 "braking\_g": "G-force during braking",

 "cornering\_g": "G-force during cornering",

 "safety\_score": "Overall driver safety rating",

 "following\_distance": "Distance to vehicle ahead",

 "lane\_position": "Position within lane",

 "distraction\_events": "Driver distraction count"

}

**Compliance Extensions**

**ADR (Dangerous Goods)**

{

 "dangerous\_goods\_class": "ADR classification (Class 1-9)",

 "un\_number": "UN identification number",

 "packaging\_group": "Packaging classification",

 "route\_restriction": "Route limitations",

 "emergency\_procedures": "Emergency response protocols",

 "driver\_certification": "ADR driver certificate status"

}

**ISO 9001 (Quality Management)**

{

 "process\_compliance\_score": "Process adherence rating",

 "customer\_satisfaction": "Customer feedback score",

 "quality\_kpi": "Quality performance indicators",

 "document\_control": "Document version control",

 "corrective\_action": "CAPA tracking",

 "audit\_score": "Internal audit results"

}

**Euro 6/7 (Emissions)**

{

 "euro\_compliance\_level": "Euro standard compliance",

 "pm\_emission": "Particulate matter emissions",

 "hc\_emission": "Hydrocarbon emissions",

 "co\_emission": "Carbon monoxide emissions",

 "adblue\_consumption": "AdBlue usage rate",

 "dpf\_status": "Diesel particulate filter status"

}

**ISO 14001 (Environmental)**

{

 "waste\_generated": "Waste production quantity",

 "recycling\_rate": "Recycling percentage",

 "water\_consumption": "Water usage",

 "energy\_consumption": "Energy usage",

 "carbon\_footprint": "CO2 equivalent emissions",

 "environmental\_kpi": "Environmental performance"

}

**ISO 45001 (Safety)**

{

 "accident\_severity": "Incident severity level",

 "near\_miss\_count": "Near-miss event count",

 "safety\_training\_hours": "Safety training duration",

 "risk\_assessment\_score": "Risk evaluation rating",

 "ppe\_compliance": "Personal protective equipment compliance",

 "ltir": "Lost time injury rate"

}

**GDPR/KVKK (Privacy)**

{

 "data\_anonymization\_level": "Data protection level",

 "consent\_status": "Data processing consent",

 "data\_retention\_period": "Data storage duration",

 "lawful\_basis": "Legal basis for processing"

}

**Full Extension List**

*For complete extension details, see the JSON profile file.*

**Templates**

**Operational Templates**

* **run-started** - Journey initialization
* **fuel-consumed** - Fuel usage tracking
* **maintenance-performed** - Completed maintenance
* **maintenance-predicted** - Predictive maintenance
* **daily-summary** - Daily operation summary
* **cost-calculated** - Cost computation

**Compliance Templates**

* **compliance-assessed** - Regulatory assessment
* **safety-incident** - Safety event recording
* **environmental-impact** - Environmental reporting
* **quality-metric** - Quality measurement
* **certification-achieved** - Certification completion

**Patterns**

**Complete Run Lifecycle**

Tracks a complete journey with all associated events, maintenance, fuel, cost tracking, and compliance monitoring.

{

 "sequence": [

 "vehicle.initialized.run",

 "driver.experienced.various-events",

 "vehicle.consumed.fuel",

 "system.calculated.costs",

 "system.assessed.compliance",

 "vehicle.completed.run"

 ]

}

**Compliance Assessment Cycle**

Complete compliance monitoring including ISO standards, ADR, emissions, and certifications.

**Sustainability Reporting**

Environmental impact tracking with carbon footprint, emissions, and green certifications.

**Data Sources**

**Hardware Sources**

* **GPS/GNSS Receivers** - Position, speed, time
* **CAN-Bus/J1939** - Engine and vehicle data
* **OBD-II Ports** - Diagnostic information
* **Accelerometers/Gyroscopes** - Motion detection
* **ADAS Cameras** - Driver monitoring, lane detection
* **Load Sensors** - Cargo weight and distribution
* **TPMS Sensors** - Tire pressure and temperature
* **Fuel Flow Meters** - Consumption measurement

**Software Sources**

* **Fleet Management Systems** - Operational data
* **ERP Systems** - Financial integration
* **TMS (Transport Management)** - Route planning
* **WMS (Warehouse Management)** - Cargo handling
* **Maintenance Systems** - Service scheduling
* **Quality Management** - ISO 9001 compliance
* **Environmental Systems** - ISO 14001 tracking
* **Safety Systems** - ISO 45001 monitoring
* **HR Systems** - Driver certifications

**External Sources**

* **Weather APIs** - Environmental conditions
* **Traffic Systems** - Road conditions
* **Regulatory Databases** - Compliance standards
* **Certification Bodies** - Standard validation

**Implementation Guide**

**Prerequisites**

1. **xAPI LRS** - Learning Record Store with xAPI 1.0.3+ support
2. **Profile Registration** - Load profile into LRS
3. **Data Integration** - Connect vehicle and system data sources
4. **Authentication** - Set up secure API access

**Basic Implementation Steps**

**1. Profile Installation**

// Register the profile with your LRS

const profile = {

 "@context": "https://w3id.org/xapi/profiles/context",

 "id": "https://promptever.com/xapi/fleet/v1",

 // ... profile content

};

await lrs.registerProfile(profile);

**2. Statement Creation**

// Example: Vehicle started a run

const statement = {

 "actor": {

 "objectType": "Agent",

 "name": "TR-34-ABC-123",

 "mbox": "mailto:vehicle.tr34abc123@fleet.company.com"

 },

 "verb": {

 "id": "https://adlnet.gov/expapi/verbs/initialized",

 "display": {"en-US": "initialized"}

 },

 "object": {

 "objectType": "Activity",

 "id": "https://fleet.company.com/runs/run-20241127-001",

 "definition": {

 "type": "https://promptever.com/xapi/fleet/v1/activity-types/run-lifecycle",

 "name": {"en-US": "Route to Customer A"}

 }

 },

 "result": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/telemetry/odometer\_km": 45623.7,

 "https://promptever.com/xapi/fleet/v1/extensions/telemetry/fuel\_level\_pct": 87.3

 }

 },

 "context": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/telemetry/position": {

 "latitude": 40.9924,

 "longitude": 29.0252,

 "altitude": 125

 }

 }

 }

};

await lrs.sendStatement(statement);

**3. Compliance Tracking**

// Example: ISO 39001 Safety Compliance

const safetyStatement = {

 "actor": {

 "objectType": "Agent",

 "name": "Driver-001",

 "mbox": "mailto:driver001@fleet.company.com"

 },

 "verb": {

 "id": "https://adlnet.gov/expapi/verbs/experienced",

 "display": {"en-US": "experienced"}

 },

 "object": {

 "objectType": "Activity",

 "id": "https://fleet.company.com/events/harsh-brake-20241127-001",

 "definition": {

 "type": "https://promptever.com/xapi/fleet/v1/activity-types/harsh-brake",

 "name": {"en-US": "Harsh Braking Event"}

 }

 },

 "result": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/driver/braking\_g": -2.8,

 "https://promptever.com/xapi/fleet/v1/extensions/driver/safety\_score": 72

 }

 }

};

**Advanced Implementation**

**Data Pipeline Integration**

// Real-time data streaming

class FleetDataPipeline {

 constructor(lrsEndpoint, profileId) {

 this.lrs = new LRS(lrsEndpoint);

 this.profile = profileId;

 }

 async processVehicleData(vehicleId, telemetryData) {

 const statements = this.mapTelemetryToStatements(vehicleId, telemetryData);

 await this.lrs.sendStatements(statements);

 }

 mapTelemetryToStatements(vehicleId, data) {

 return data.map(point => ({

 actor: this.createVehicleActor(vehicleId),

 verb: this.selectAppropriateVerb(point.eventType),

 object: this.createActivityObject(point),

 result: this.mapExtensions(point),

 timestamp: point.timestamp

 }));

 }

}

**Usage Examples**

**Example 1: Complete Run Tracking**

{

 "actor": {"name": "TR-34-ABC-123"},

 "verb": {"id": "https://adlnet.gov/expapi/verbs/initialized"},

 "object": {

 "definition": {

 "type": "https://promptever.com/xapi/fleet/v1/activity-types/run-lifecycle"

 }

 },

 "result": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/telemetry/odometer\_km": 45623.7,

 "https://promptever.com/xapi/fleet/v1/extensions/fuel/total\_consumed\_l": 0.0,

 "https://promptever.com/xapi/fleet/v1/extensions/operational/eta": "2024-11-27T14:30:00Z"

 }

 }

}

**Example 2: ADR Compliance Tracking**

{

 "actor": {"name": "TR-34-ADR-456"},

 "verb": {"id": "https://promptever.com/xapi/fleet/v1/verbs/complied"},

 "object": {

 "definition": {

 "type": "https://promptever.com/xapi/fleet/v1/activity-types/compliance-event"

 }

 },

 "context": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/adr/dangerous\_goods\_class": "Class 3",

 "https://promptever.com/xapi/fleet/v1/extensions/adr/un\_number": "UN1203",

 "https://promptever.com/xapi/fleet/v1/extensions/adr/driver\_certification": "Valid-ADR-Tank"

 }

 }

}

**Example 3: Predictive Maintenance**

{

 "actor": {"name": "AI-Maintenance-System"},

 "verb": {"id": "https://promptever.com/xapi/fleet/v1/verbs/predicted"},

 "object": {

 "definition": {

 "type": "https://promptever.com/xapi/fleet/v1/activity-types/maintenance-event"

 }

 },

 "result": {

 "extensions": {

 "https://promptever.com/xapi/fleet/v1/extensions/maintenance/brake\_pad\_thickness": 3.2,

 "https://promptever.com/xapi/fleet/v1/extensions/maintenance/next\_service\_km": 1850

 }

 }

}

**Compliance Mapping**

**ISO 39001 (Road Traffic Safety)**

* **Driver Behavior Extensions** → Safety score calculation
* **Incident Tracking** → Accident severity, near-miss events
* **Training Compliance** → Safety training hours
* **Risk Management** → Risk assessment scores

**ISO 55000 (Asset Management)**

* **Asset Lifecycle** → Acquisition, operation, disposal stages
* **Maintenance Optimization** → Predictive maintenance, MTBF
* **Value Tracking** → Asset valuation, depreciation rates
* **Performance Monitoring** → Utilization rates, replacement priority

**ISO 9001 (Quality Management)**

* **Process Control** → Compliance scoring, audit results
* **Customer Focus** → Satisfaction scores, feedback integration
* **Documentation** → Document control status
* **Improvement** → Corrective actions, quality KPIs

**ISO 14001 (Environmental Management)**

* **Environmental Monitoring** → Waste, water, energy tracking
* **Carbon Management** → Footprint calculation, offset tracking
* **Compliance Tracking** → Environmental KPI scores
* **Resource Efficiency** → Recycling rates, consumption optimization

**ISO 45001 (Occupational Health & Safety)**

* **Incident Management** → Severity classification, LTIR tracking
* **Risk Assessment** → Systematic risk scoring
* **Training Compliance** → Safety training hour tracking
* **Equipment Compliance** → PPE usage monitoring

**Best Practices**

**Data Quality**

1. **Validation** - Implement data validation at collection points
2. **Completeness** - Ensure all required extensions are populated
3. **Consistency** - Maintain consistent naming and formatting
4. **Timeliness** - Process data in near real-time where possible

**Performance Optimization**

1. **Batching** - Group statements for efficient LRS communication
2. **Caching** - Cache frequent queries and profile lookups
3. **Indexing** - Optimize LRS indexes for common query patterns
4. **Compression** - Use compression for large data transfers

**Security Considerations**

1. **Authentication** - Implement strong API authentication
2. **Authorization** - Role-based access to sensitive data
3. **Encryption** - Encrypt data in transit and at rest
4. **Privacy** - Apply appropriate anonymization levels
5. **Audit** - Maintain comprehensive audit trails

**Compliance Monitoring**

1. **Real-time Alerts** - Set up notifications for compliance violations
2. **Regular Reporting** - Generate periodic compliance reports
3. **Trend Analysis** - Monitor compliance trends over time
4. **Exception Handling** - Define procedures for non-compliance events

**Support and Resources**

**Technical Support**

* **Profile Issues**: Submit issues to the profile repository
* **Implementation Help**: Contact Promptever technical team
* **Standards Questions**: Refer to official ISO/ADR documentation

**Additional Resources**

* **xAPI Specification**: [ADL xAPI GitHub](https://github.com/adlnet/xAPI-Spec)
* **Profile Specification**: [xAPI Profiles Specification](https://github.com/adlnet/xapi-profiles)
* **Fleet Management Standards**: Refer to individual standard documentation

**Version History**

* **v1.0** - Initial release with comprehensive standard coverage
* **Future Versions** - Will include additional standards and extensions as needed

*This documentation covers the complete Promptever Fleet Management xAPI Profile. For the latest updates and additional resources, visit the project repository.*