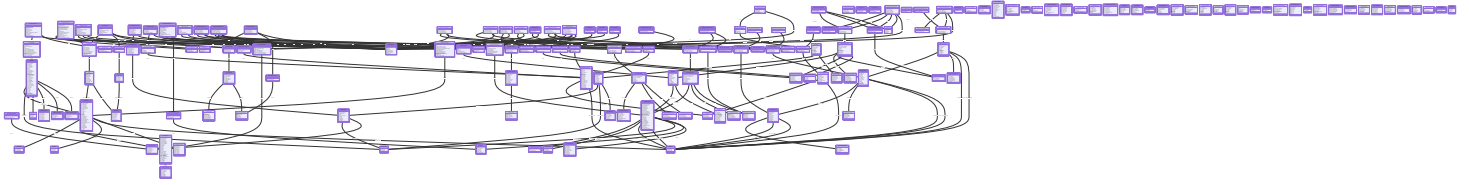# ITLDIS Spares Module - UML Class Diagram

Module Overview

The **Spares Module** is a comprehensive module in the ITLDIS application that handles spare parts inventory management, sales, purchase, requisition, and reporting. It is one of the largest modules with 239 Java files.

Core Sub-Modules:

1. Invoice Management

- Create invoices from sales orders, job cards, or warranty claims
- Invoice cancellation functionality
- Support for part details, labour charges, and outside charges
- Invoice search and view
- Excel export for part sales reports

2. Sales Order Management

- Create sales orders from quotations
- Support for multiple customer types (Dealer, Retailer, Mechanic, etc.)
- Sales order search and view
- Excel upload for bulk item entry
- Excel export for sales order reports
- Track back quantities for partial fulfillment

3. Quotation Management

- Create quotations for customers
- Convert quotations to sales orders

- Quotation search and view
- Excel upload for bulk item entry
- Support for discount types and rates

4. Picklist & Counter Sales

- Create picklists from sales orders
- Picklist return functionality
- Stock update on picklist creation
- Picklist search and view
- Integration with stock management

5. Part Requisition Management

- Create part requisitions (APR - Auto Part Requisition)
- Link requisitions to job cards
- Part issue from requisitions
- Part return functionality
- Requisition, issue, and return search

6. Purchase Order Management

- Create purchase orders with multiple order types
- Support for different supplier types
- Purchase order approval workflow
- Integration with Order Planning Sheet (OPS)
- Dealer outstanding tracking
- Excel upload for bulk item entry
- Excel export for purchase order reports

7. GRN (Goods Receipt Note) Management

- Create GRN from purchase orders
- Track ordered, received, accepted, and rejected quantities
- GRN search and view
- Integration with stock management

8. Order Planning Sheet (OPS)

- Generate order planning sheets based on stock levels
- Suggest order quantities based on min/max stock

- Support for multiple order types
- OPS item details and logic management

9. Back Order Cancellation

- Cancel back orders from purchase orders
- Back order cancellation approval workflow
- Track cancellation reasons

10. Discrepancy Claim & MMR Request

- Create discrepancy claims for GRN items
- Support for attachments
- Discrepancy claim approval workflow
- KAI additional remarks tracking

11. Block Parts for Sale

- Block/unblock parts for sale
- Search blocked parts

12. Binning Slip

- Generate binning slips for GRN items
- Track bin locations for received items

13. Transit Report

- Generate transit reports for items in transit
- Track items between branches

14. Stock Adjustment

- Create stock adjustments
- Stock adjustment approval workflow
- Track adjustment reasons and quantities

15. Branch Transfer Management

- **Indent**: Create branch transfer indents
- **Issue**: Issue items from source branch
- **Receipt**: Receive items at destination branch

- Track transfer status and quantities

16. Bin-to-Bin Transfer

- Transfer items between bins within a store
- Track bin locations and quantities

17. Current Stock Management

- View current stock by item, store, and bin
- Current stock search and reports
- Excel export for stock reports

18. Machine Stock Management

- Track stock allocated to specific machines
- Machine stock search and view

19. Non-Moving Inventory

- Identify non-moving inventory items
- Track last movement date
- Non-moving inventory reports

20. Reports

- Back order parts reports
- Closing stock reports
- Inventory movement reports
- Item movement reports
- Non-moving parts stock reports

Key Components:

- **25 Controllers**: REST controllers handling HTTP requests
- **10 Service Interfaces**: Business logic interfaces
- **10 Service Implementations**: Business logic implementations
- **30+ Repositories**: Data access layer using Spring Data JPA
- **50+ Domain Entities**: JPA entities representing database tables
- **40+ DTOs**: Data transfer objects for API communication

Technology Stack:

- **Framework**: Spring Boot (REST API)
- **ORM**: JPA/Hibernate
- **Database**: SQL Server
- **File Storage**: StorageService (for attachment management)
- **Reporting**: Excel export using ExcelCellGenerator
- **Security**: UserAuthentication service

Key Relationships:

1. **Invoice → Sales Order/Job Card/WCR**: Invoice can be created from sales order, job card, or warranty claim
2. **Sales Order → Quotation**: Sales order can be created from quotation
3. **Picklist → Sales Order**: Picklist is created from sales order
4. **Part Requisition → Job Card**: Part requisition is linked to job card
5. **Part Issue → Part Requisition**: Part issue is created from requisition
6. **Part Return → Part Issue**: Part return is created from part issue
7. **GRN → Purchase Order**: GRN is created from purchase order
8. **Purchase Order → Order Planning Sheet**: Purchase order can be created from OPS
9. **Branch Transfer**: Indent → Issue → Receipt workflow
10. **Stock Management**: All transactions update stock through SpareStockStoreBinDetail

Data Flow:

1. **Request Flow**: HTTP Request → Controller → Service → Repository → Database
2. **Response Flow**: Database → Repository → Service → DTO → Controller → JSON Response
3. **File Upload Flow**: MultipartFile → Controller → Service → Excel Processing → Data Extraction
4. **Approval Flow**: Entity → Approval Entity → Repository → Database
5. **Stock Update Flow**: Transaction → Stock Update → SpareStockStoreBinDetail → Database
6. **Report Generation**: Entity Data → ExcelCellGenerator → Excel Output

Key Features:

- **Multi-level Approval Workflows**: Purchase orders, back order cancellations, discrepancy claims, and stock adjustments support approval workflows
- **Excel Import/Export**: Bulk operations and reporting via Excel
- **Comprehensive Search**: Advanced search capabilities across all sub-modules
- **Stock Management**: Real-time stock tracking with bin-level detail

- **Integration**: Seamless integration with Service Module, Warranty Module, and Masters Module
- **Branch Transfer**: Complete workflow for inter-branch transfers
- **Inventory Reports**: Multiple reports for inventory analysis and management