

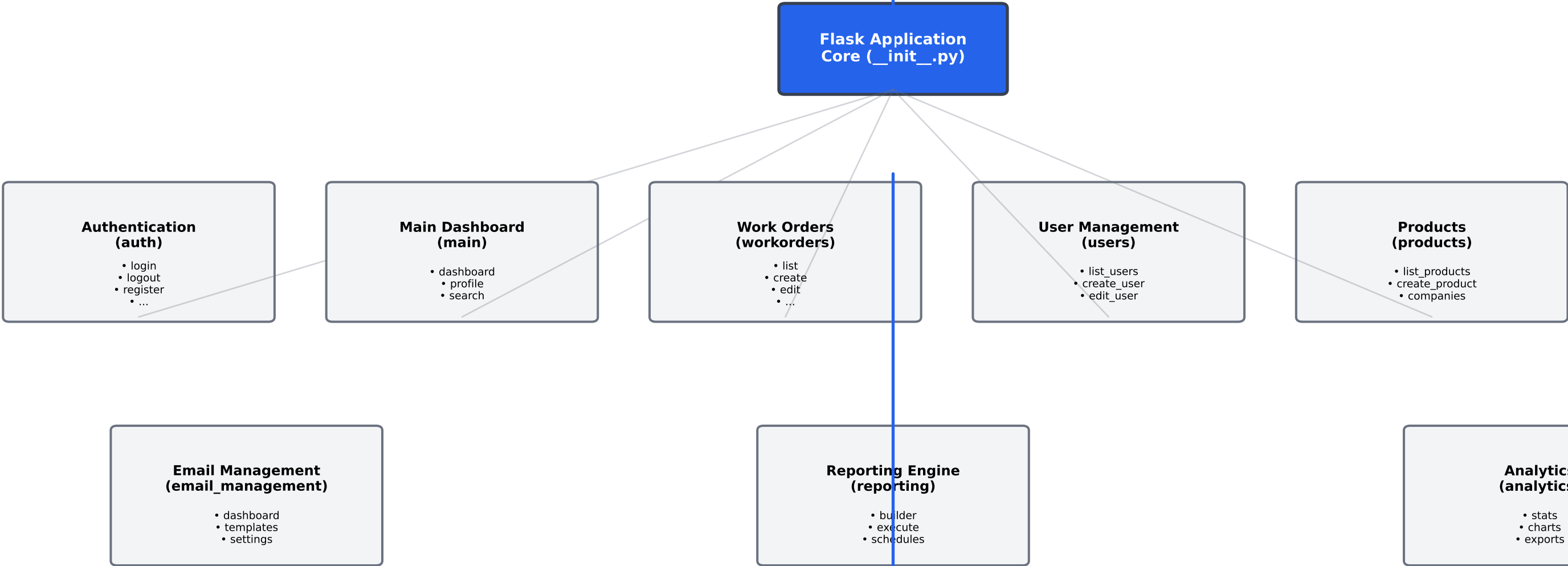
CUBE-PRO Enterprise Work Order Management System

Application Architecture

PRESENTATION LAYER



APPLICATION LAYER - FLASK FRAMEWORK



BUSINESS LOGIC LAYER



DATA LAYER



Core Framework (Flask)

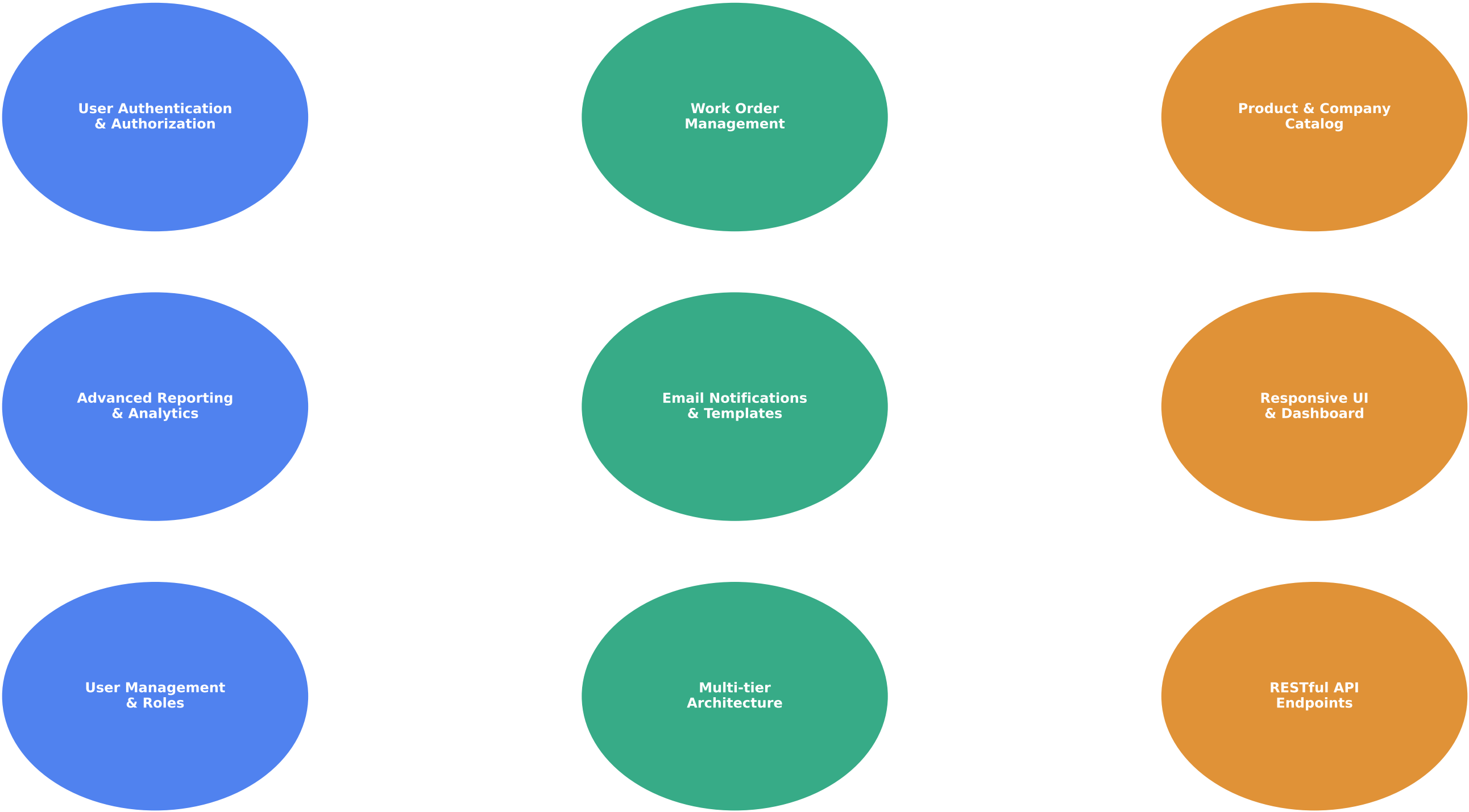
Frontend/Data Models

Blueprint Modules

Business Services

Database Layer

CUBE-PRO Detailed Component Interactions & Data Flow



DATA FLOW & SECURITY MODEL

Security Features:

1. CSRF Protection (WTForms)
2. Password Hashing (Werkzeug)
3. Session Management (Flask-Login)
4. Role-Based Access Control
5. SQL Injection Prevention (SQLAlchemy ORM)
6. Input Validation & Sanitization

Technology Stack:

- Backend: Python Flask Framework
- Database: SQLite with SQLAlchemy ORM
- Frontend: HTML5, Bootstrap 5, JavaScript
- Authentication: Flask-Login
- Forms: WTForms with CSRF protection
- Email: SMTP integration
- Charts: Chart.js for analytics
- PDF Generation: ReportLab

CUBE-PRO Deployment Architecture & Infrastructure

DEVELOPMENT ENVIRONMENT

- Python Virtual Environment (.venv)
- Flask Development Server
- SQLite Database (workorder.db)
- Debug Mode: ON
- Hot Reload: Enabled
- Port: 5000 (localhost)

PRODUCTION ENVIRONMENT

- WSGI Server (Gunicorn/uWSGI)
- Reverse Proxy (Nginx)
- PostgreSQL/MySQL Database
- SSL/TLS Encryption
- Load Balancing
- Monitoring & Logging

PROJECT STRUCTURE

```
CUBE/
├── app/
│   ├── __init__.py (Flask app factory)
│   ├── models.py (Database models)
│   ├── auth/ (Authentication blueprint)
│   ├── main/ (Dashboard blueprint)
│   ├── workorders/ (Work order management)
│   ├── users/ (User management)
│   ├── products/ (Product catalog)
│   ├── email_management/ (Email system)
│   ├── reporting/ (Analytics engine)
│   ├── templates/ (Jinja2 templates)
│   └── static/ (CSS, JS, images)
├── instance/ (Database files)
├── requirements.txt (Dependencies)
├── run.py (Application entry point)
└── Documentation (PDFs, guides)
```

SCALABILITY CONSIDERATIONS:

- Modular Blueprint Architecture
- Database Migration Support (Flask-Migrate)
- RESTful API Design
- Stateless Session Management
- Caching Strategy Ready
- Horizontal Scaling Capable
- Microservices Migration Path
- Container Deployment Ready (Docker)