Create a modern accounting tool for Pine Hill Farm that integrates multiple business systems into a unified admin dashboard. This tool should provide real-time financial visibility and streamlined workflow management.

**Core Requirements**

**1. System Architecture**

* **Platform**: Build using modern web technologies suitable for Replit deployment
* **Framework**: Use React.js or Next.js for the frontend with Node.js backend
* **Database**: PostgreSQL or MongoDB for local data storage and caching
* **Authentication**: Implement secure admin-only access with role-based permissions
* **Responsive Design**: Ensure mobile and tablet compatibility for field access

**2. Integration Requirements**

**QuickBooks Online Integration**

* **Purpose**: Primary accounting system integration
* **Required Features**:
  + Real-time sync of chart of accounts, customers, vendors, and transactions
  + Automated journal entry creation from other systems
  + Invoice and bill management
  + Financial reporting and reconciliation tools
  + Tax preparation data export
* **API**: Use QuickBooks Online API v3
* **Authentication**: OAuth 2.0 implementation
* **Sync Frequency**: Real-time for transactions, daily for reference data

**Clover POS Integration**

* **Purpose**: Point-of-sale transaction aggregation
* **Required Features**:
  + Daily sales summaries and detailed transaction logs
  + Payment method breakdowns (cash, card, mobile payments)
  + Product performance analytics
  + Automatic posting to QuickBooks as daily sales entries
  + Inventory adjustment notifications
* **API**: Clover REST API
* **Data Flow**: POS → Dashboard → QuickBooks

**HSA Purchasing Tools Integration**

* **Purpose**: Health Savings Account expense tracking
* **Required Features**:
  + HSA-eligible expense categorization
  + Receipt management and documentation
  + Compliance reporting for tax purposes
  + Integration with payroll systems for HSA contributions
  + Automated expense approval workflows
* **Implementation**: Connect via API if available, or CSV import functionality
* **Compliance**: Ensure HIPAA-compliant data handling

**Thrive.com Inventory Management Integration**

* **Purpose**: Real-time inventory and cost tracking
* **Required Features**:
  + Current stock levels and valuation
  + Cost of goods sold calculations
  + Automatic inventory adjustments in QuickBooks
  + Purchase order tracking and receiving
  + Low stock alerts and reorder point management
  + Vendor performance analytics
* **API**: Thrive API integration
* **Sync**: Real-time inventory updates

**3. Dashboard Features**

**Main Dashboard**

* **Financial Summary**: Real-time P&L, cash flow, and key metrics
* **System Status**: Connection status for all integrated systems
* **Alert Center**: Low inventory, overdue payments, sync errors
* **Quick Actions**: Common tasks like creating invoices, processing payments

**Financial Management Module**

* **Unified Transaction View**: All transactions from all systems in one place
* **Reconciliation Tools**: Bank statement matching and variance analysis
* **Custom Reporting**: Drag-and-drop report builder
* **Budget vs Actual**: Real-time budget tracking and variance analysis

**Inventory Management Module**

* **Real-time Stock Levels**: Current inventory across all locations
* **Cost Analysis**: COGS, margin analysis, and profitability reports
* **Purchase Management**: PO creation, tracking, and receiving
* **Valuation Reports**: FIFO, LIFO, and weighted average calculations

**Sales Analytics Module**

* **POS Performance**: Daily, weekly, monthly sales trends
* **Product Analysis**: Best sellers, slow movers, seasonal trends
* **Customer Insights**: Purchase patterns and loyalty metrics
* **Profit Margin Analysis**: By product, category, and time period

**4. Technical Specifications**

**Security Requirements**

* **Data Encryption**: AES-256 encryption for data at rest and in transit
* **Access Control**: Multi-factor authentication for admin users
* **Audit Logging**: Complete activity logs for compliance
* **API Security**: Secure token management and refresh protocols
* **Network Security**: VPN or IP whitelisting for enhanced protection

**Performance Requirements**

* **Load Time**: Dashboard loads in under 3 seconds
* **Real-time Updates**: Live data refresh every 30 seconds
* **Concurrent Users**: Support for 10+ simultaneous admin users
* **Data Retention**: 7 years of historical data storage
* **Backup Strategy**: Daily automated backups with point-in-time recovery

**Integration Architecture**

* **API Management**: Centralized API gateway for all external connections
* **Error Handling**: Robust retry logic and graceful degradation
* **Data Validation**: Input sanitization and business rule enforcement
* **Sync Management**: Conflict resolution and data consistency checks

**5. User Interface Requirements**

**Design Principles**

* **Clean and Intuitive**: Minimal learning curve for farm staff
* **Mobile-First**: Touch-friendly interface for tablet use in field
* **Accessibility**: WCAG 2.1 AA compliance
* **Customizable**: User-configurable dashboards and widgets

**Key UI Components**

* **Navigation**: Sidebar with collapsible sections
* **Charts and Graphs**: Interactive visualizations using Chart.js or D3.js
* **Data Tables**: Sortable, filterable, and exportable data grids
* **Modal Dialogs**: For quick actions and detailed views
* **Notification System**: Toast notifications and alert center

**6. Data Management**

**Data Flow Architecture**

1. **Collection**: Automated data retrieval from all source systems
2. **Validation**: Business rule application and error checking
3. **Transformation**: Data normalization and mapping
4. **Storage**: Local caching and historical data retention
5. **Presentation**: Real-time dashboard updates and reporting

**Backup and Recovery**

* **Automated Backups**: Daily full backups with incremental updates
* **Disaster Recovery**: 24-hour RTO and 1-hour RPO targets
* **Data Export**: CSV, Excel, and PDF export capabilities
* **Version Control**: Track changes to configurations and customizations

**7. Compliance and Audit**

**Financial Compliance**

* **GAAP Compliance**: Ensure accounting standards adherence
* **Tax Preparation**: Automated tax document generation
* **Audit Trail**: Complete transaction history and user activity logs
* **Internal Controls**: Approval workflows and segregation of duties

**Data Privacy**

* **GDPR Compliance**: If applicable for customer data
* **PCI DSS**: For payment card information handling
* **Data Retention**: Automated purging based on retention policies
* **Privacy Controls**: User consent management and data minimization

**8. Deployment and Maintenance**

* **CI/CD Pipeline**: Automated testing and deployment
* **Monitoring**: Application performance and error tracking
* **Scaling**: Auto-scaling based on usage patterns

#### Ongoing Maintenance

* **Regular Updates**: Monthly security patches and feature updates
* **Performance Monitoring**: 24/7 uptime and performance tracking
* **User Training**: Documentation and training materials
* **Support**: Help desk integration and user support workflows

## Success Criteria

### Functional Success

* All four systems successfully integrated and syncing data
* Real-time financial visibility across all business operations
* Automated workflows reducing manual data entry by 80%
* Complete audit trail for all financial transactions

### Performance Success

* Dashboard loads in under 3 seconds
* 99.9% uptime during business hours
* Zero data synchronization errors
* Positive user adoption and satisfaction scores

### Business Success

* Reduced month-end closing time by 50%
* Improved inventory turnover through better visibility
* Enhanced financial decision-making through real-time data
* Streamlined compliance and audit processes