Separation Of Concerns

What do we mean by Concerns?

Common concerns

— **Input/Output channels**

— **Initialization**

— **Configuration - credentials**

— **Configuration - tuning**

— **Storage**

— **Query**

— **Consistency**

— **Encryption/authn/authz**

— **Deployment**

— **Failure and recovery**

Application-specific concerns

— **Bank interface**

— **Payment handling**

— **Customer service**

— **Refunds**

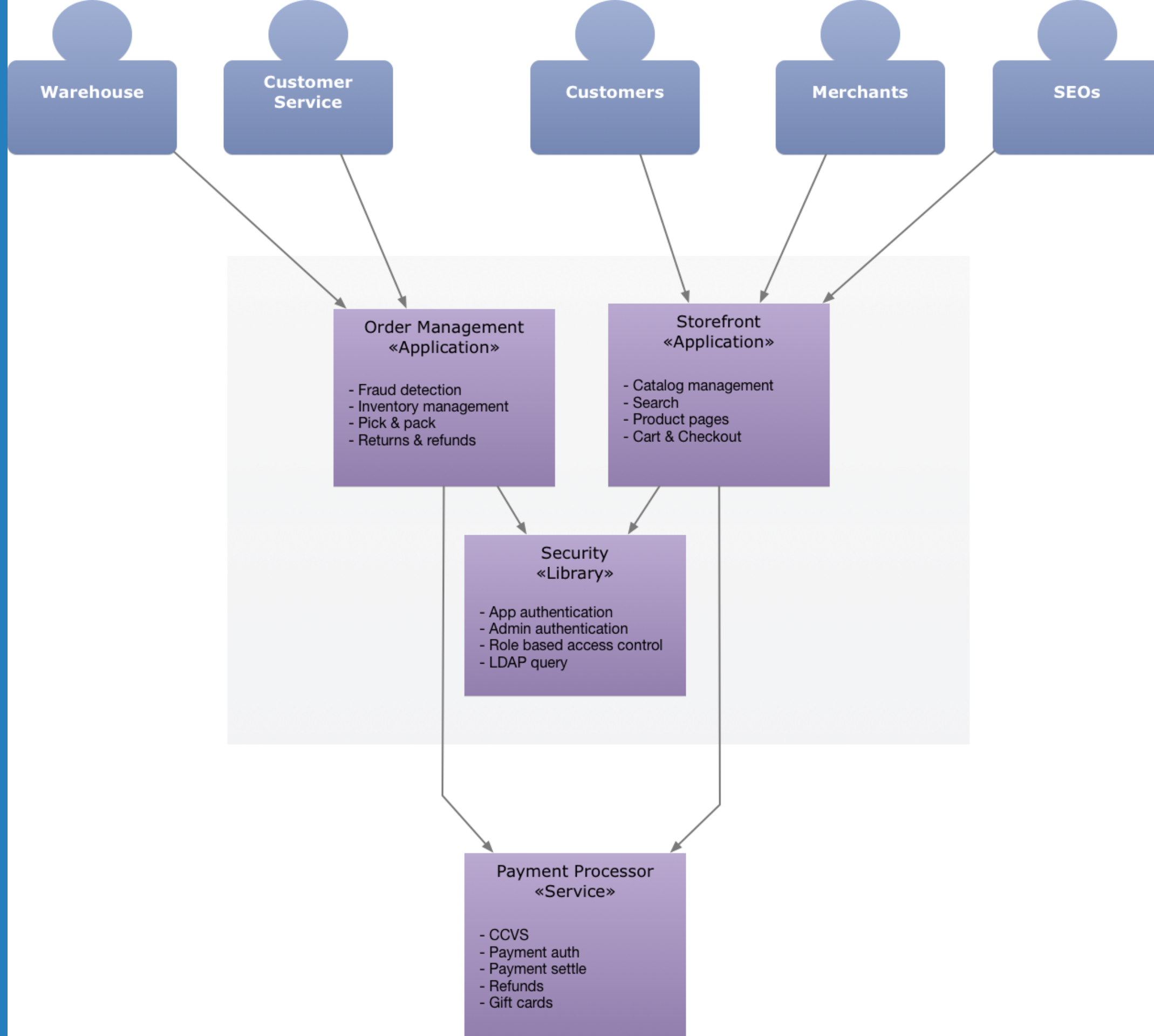— **Fraud detection/mitigation**

— **etc.**

Bounded vs Cross-cutting

Factor one thing out and something else becomes cross-cutting.

Spectrum of Change
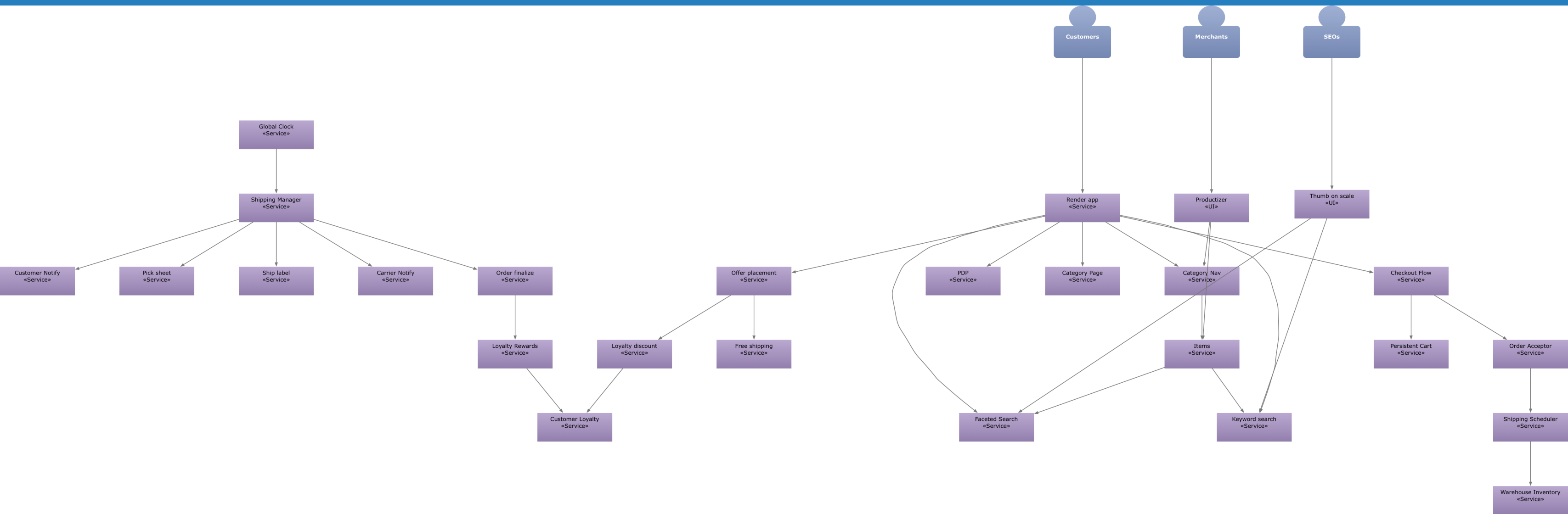
1. Data
2. Configuration
3. Code
4. Cross-cutting code
5. Language & Runtime

Example: Ecommerce System
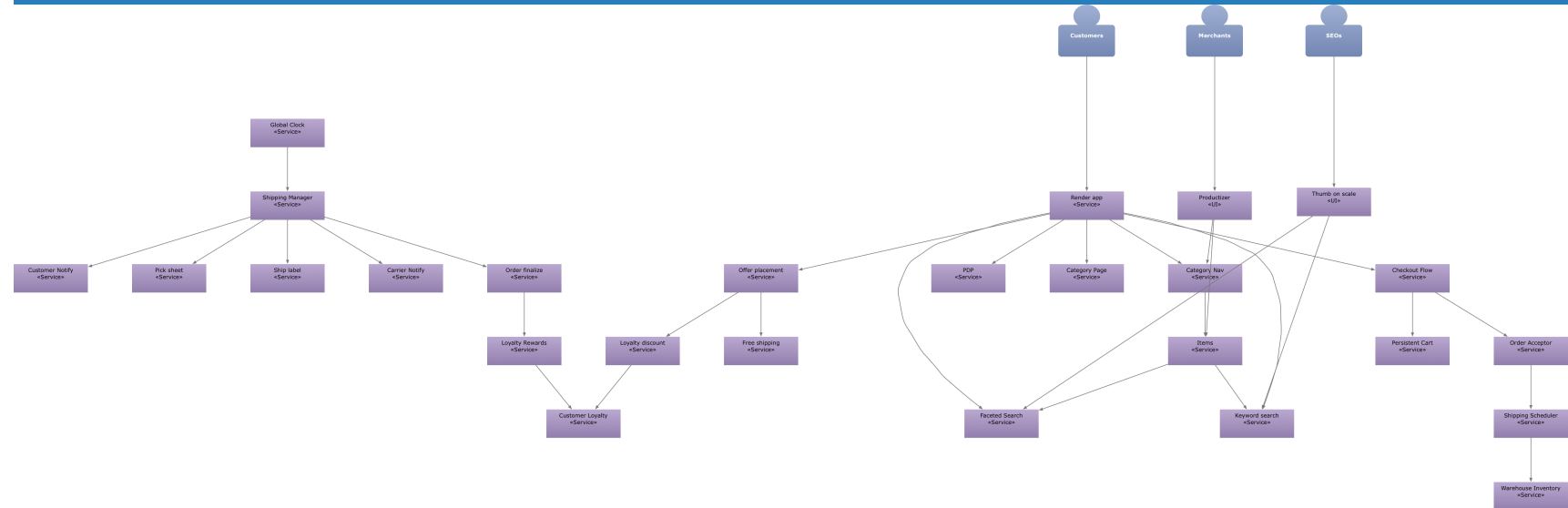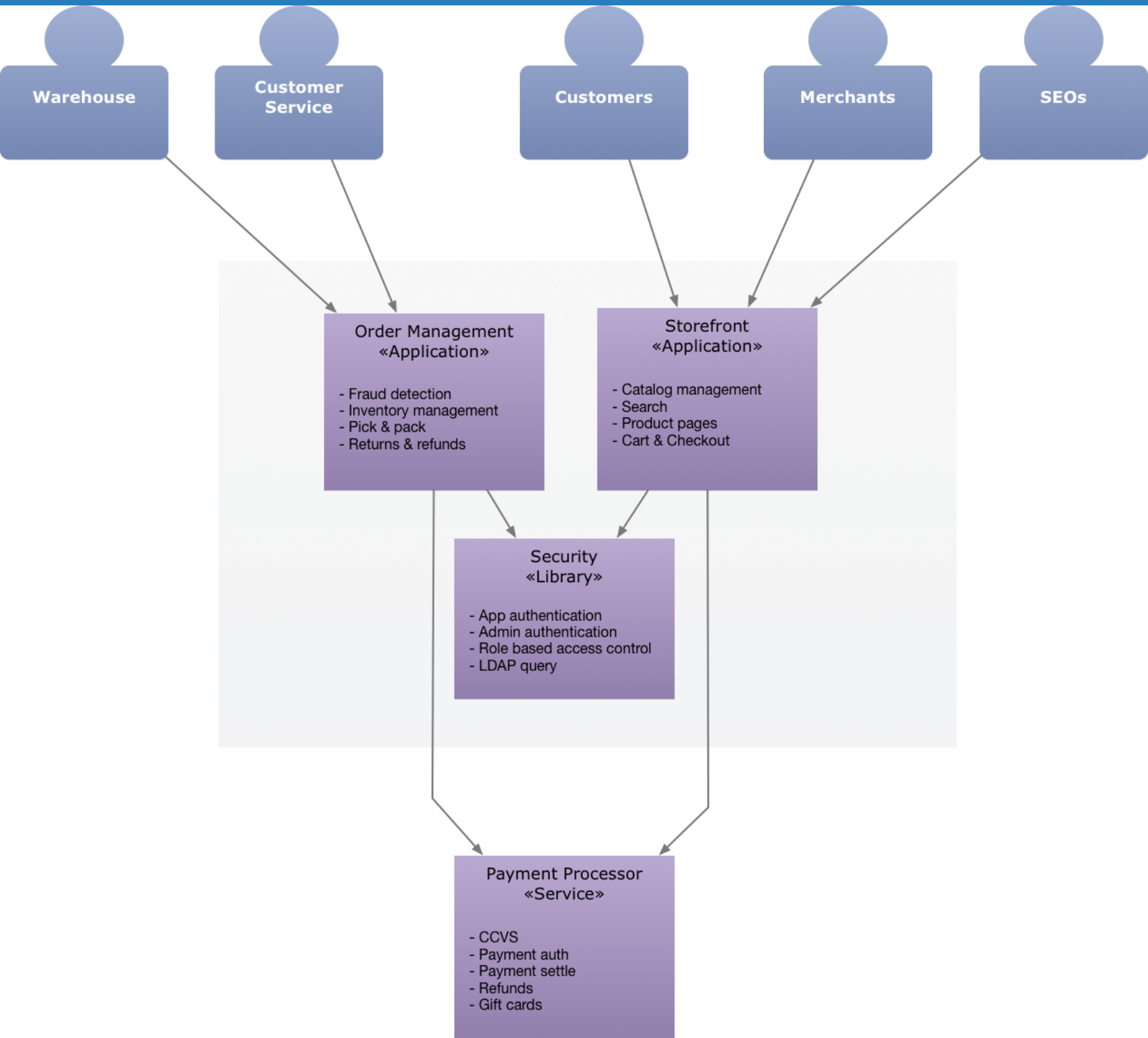
— **Show products**
— **Search & browse**
— **Add to cart**
— **Offer promotions**
— **Checkout**
— **Verify credit card**
— **Fulfill**
— **Accept returns**
— **Settle payment**
— **Issue refunds**

Global Clock
«Service»

Shipping Manager
«Service»

Customer Notify
«Service»

Pick sheet
«Service»

Ship label
«Service»

Carrier Notify
«Service»

Order finalize
«Service»

Offer placement
«Service»

PDP
«Service»

Category Page
«Service»

Category Nav
«Service»

Checkout Flow
«Service»

Loyalty Rewards
«Service»

Loyalty discount
«Service»

Free shipping
«Service»

Items
«Service»

Persistent Cart
«Service»

Order Acceptor
«Service»

Customer Loyalty
«Service»

Faceted Search
«Service»

Keyword search
«Service»

Shipping Scheduler
«Service»

Warehouse Inventory
«Service»

Customers

Merchants

SEOs

Render app
«Service»

Productizer
«UI»

Thumb on scale
«UI»

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Warehouse

Customer Service

Customers

Merchants

SEOs

Order Management
«Application»

- Fraud detection
- Inventory management
- Pick & pack
- Returns & refunds

Storefront
«Application»

- Catalog management
- Search
- Product pages
- Cart & Checkout

Security
«Library»

- App authentication
- Admin authentication
- Role based access control
- LDAP query

Payment Processor
«Service»

- CCVS
- Payment auth
- Payment settle
- Refunds
- Gift cards

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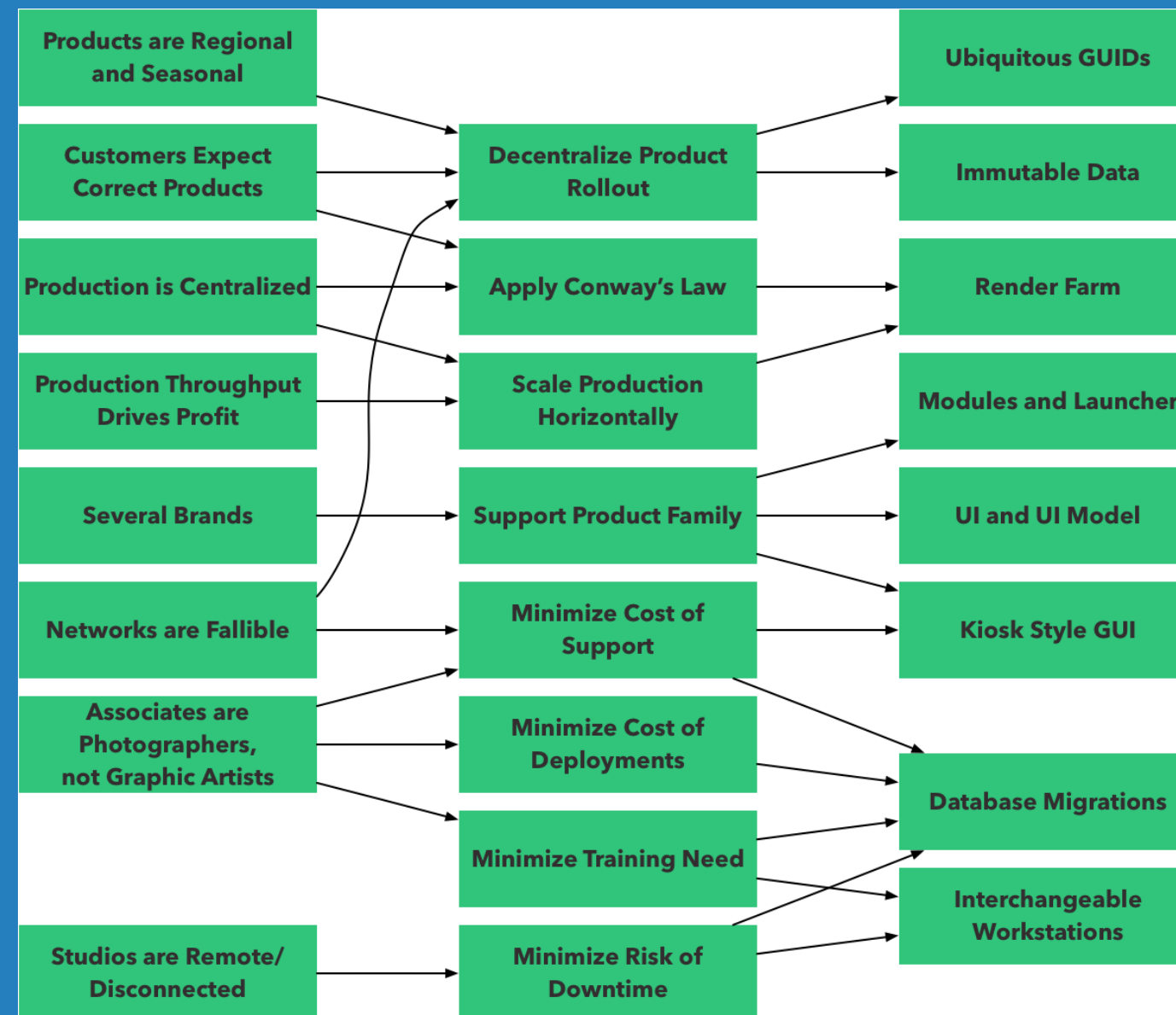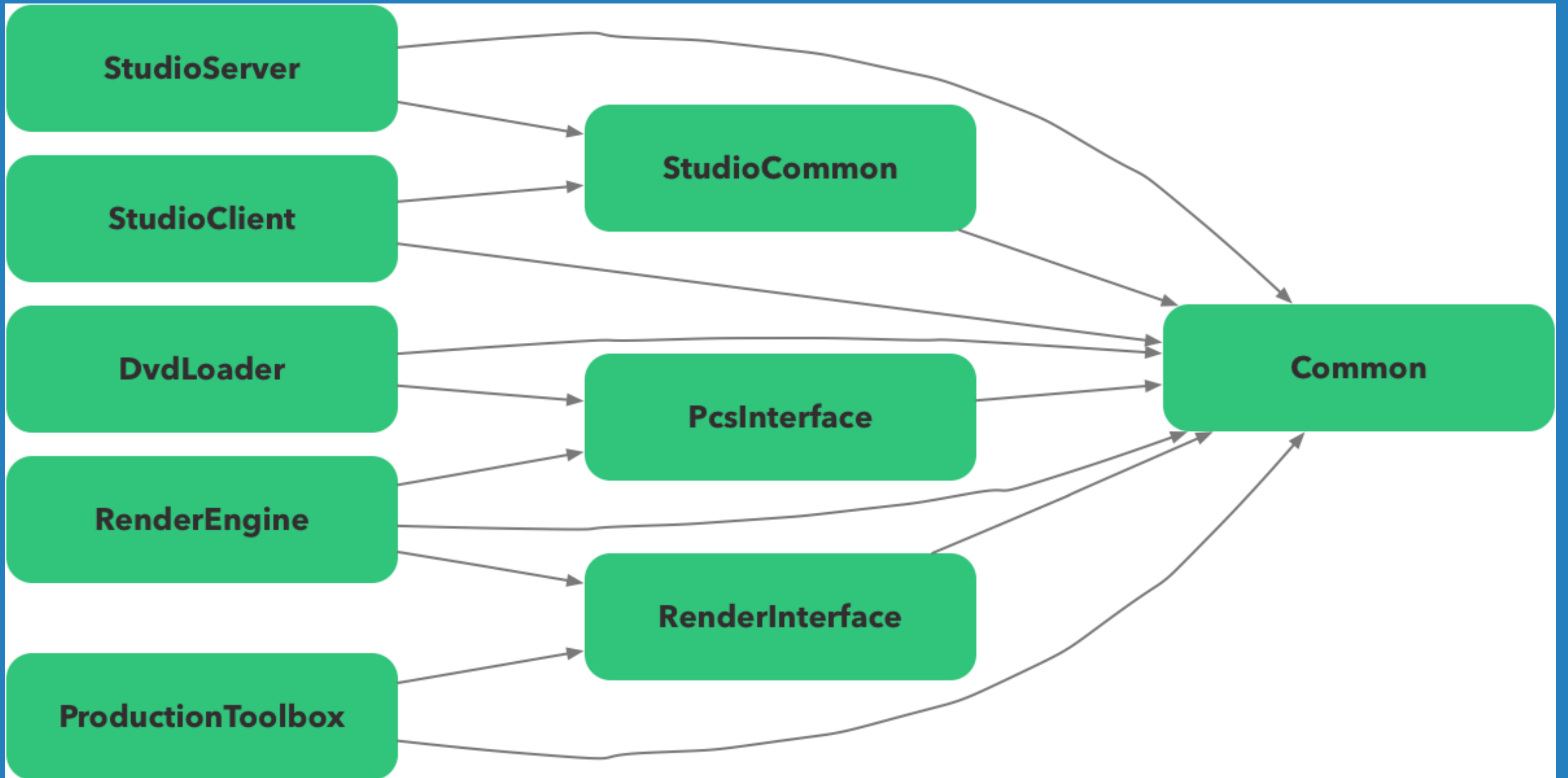«Service»

Warehouse Inventory
«Service»

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Parsimony

vs

Coupling

Real World Example - Creation Center

The architecture evolved within our vision

1. **Initial concept of layers**
2. **Property-binding architecture**
3. **Studio server vs Studio client**
4. **Use Spring for modules**
5. **Launcher for classpath**
6. **Database migrations (custom engine)**
7. **Installed and build setup.exe from CI**
8. **Production interface, render farm, toolbox**
9. **Product creation GUI**

Successful Separation of Concerns

— **UI Model vs. UI**

   — **Led to multiple "skins" for studio tools**

   — **Reused in production toolbox, product creation GUI**

   — **Automated screenshots for training manuals**

— **Render engine**

   — **Same render engine on screen and for print.**

   — **Reused for all school photos**

— **DVD object**

   — **Used for layout, packing, burning, and reading**

— **Product description**
  — **Erased difference between template and instance**
  — **Same form for product creation, templates to studios, and orders to production**
— **No need to sync products in production vs studios**
  — **Write-once, immutable products**
  — **No prior knowledge of product needed to print**
— **Local image repository format**
  — **Caching as a decorator**
  — **Changed directory hierarchy without hurting clients.**

Somewhat Successful Separation of Concerns

— **Orders too tied to DVDs**
— **OTA updates to studios difficult**

Unsuccessful Separation of Concerns

— **Trickle feed of orders from studios impossible**
— **Web UI impossible**