

MTAT.03.229
Enterprise System Integration

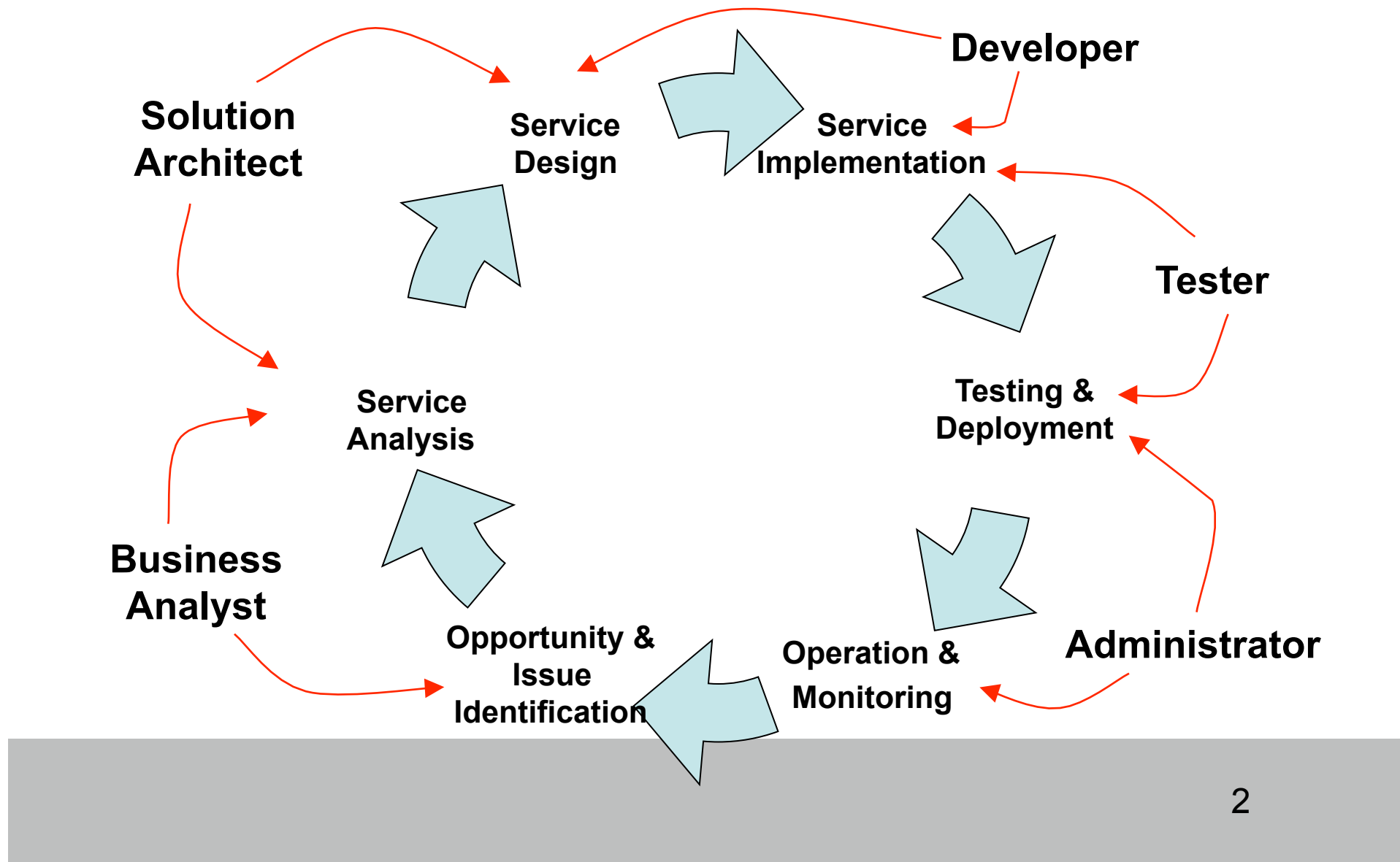
Lecture 7: Service Analysis

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Lifecycle and Roles in an SOA



Service Analysis & Design

Service Analysis: identification and definition of the business services that an organization provides or consumes, internally or externally.

- Identify and define services, their context and their interactions

Service Design: identification and definition of technical services to support the delivery of business services through IT.

- Identify and define services, operations, inputs & outputs



Service Analysis & Design Methods

- Top-down capability-driven method
 - Steve Jones: “[Enterprise SOA Adoption Strategies](#)”. InfoQ, 2005.
 - [Microsoft Motion Business-Capability Mapping](#)
- Bottom-up process-driven methods:
 - Thomas Erl: “Service-Oriented Architecture, Concepts, Technology, and Design”, Prentice Hall, 2005
- Hybrid methods:
 - SOAD Method: O. Zimmermann et al.
[Elements of Service-Oriented Analysis and Design](#), IBM, 2004 (see also IBM SOMA method)
 - B. Hess et al.
[Structuring Software Cities - A Multidimensional Approach.](#)

Top-down Service Analysis (S. Jones method)

Service:

“A discrete domain of control where a collection of tasks are performed to achieve a goal. A service embodies a *capability* provided by an organizational entity.”

Actor

- Consumer (person, system or service) of a service.
- Actors are external to the services

Interaction

An encounter between two services or between an actor and a service aimed at achieving a goal.

An interaction can be:

- physical
- electronic: manual / semi-manual / automated

An interaction has an “initiator” (the party that starts the interaction)



Top-down Service Analysis

Four step framework

definition of the services scope:
what the services are

WHAT

Services



external actors driving or interacting
with the services

WHO

Actors



reasons of the service-to-service and
service-to-actor interactions

WHY

Interactions



details of services to be delivered by
the IT team

HOW

Design &
Implementation of
Services



Top-down Service Analysis

The framework is applied at increasingly finer levels of granularity

Level 0

- Definition of the core services to the business domain.

Level 1

- Decomposition of the Level 0 model into finer-grained services for each core service.

Level 2+

- Further refinements of the previous levels, defining support and shared services integrating and complementing the services already defined.



Top-down Service Analysis

Pharmaceutical company “Pharmak” has four main areas:

- **Sales:**
 - contacts customer
 - receives order from customer
 - checks stock
 - requests for an order to be shipped - if item(s) on the order are available
- **Manufacture:**
 - makes item(s)
 - requests for an order to be shipped - after manufacturing the item(s)
- **Logistics & Warehouse:**
 - adds new item(s) into stock
 - requests an external company, or internal logistics, to deliver an order to a customer
 - receives supplies from suppliers



Top-down Service Analysis

- **Finance:**
 - prepares bill for customer
 - orders raw materials from suppliers
 - receives invoice from suppliers
 - prepares invoice for customer

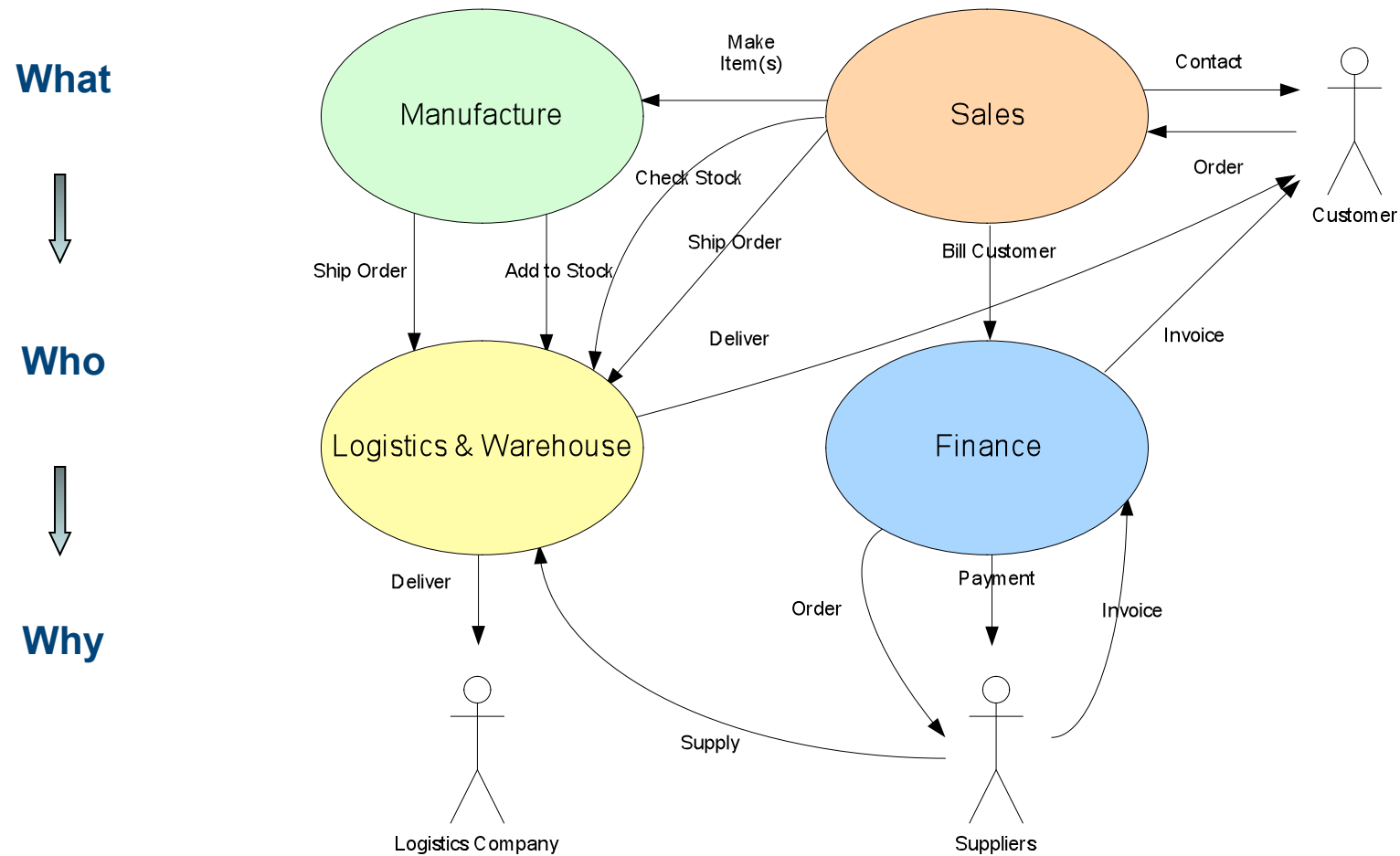
The organization interacts with the following partners:

- **Customer:**
 - organization which buys, and potentially distributes manufactured products
- **Suppliers:**
 - manufacturers or wholesalers of components/raw materials
- **Logistics Provider:**
 - provides storage and transport services



Top-down Service Analysis

“Level 0” Service Interaction Diagram



Top-down Service Analysis

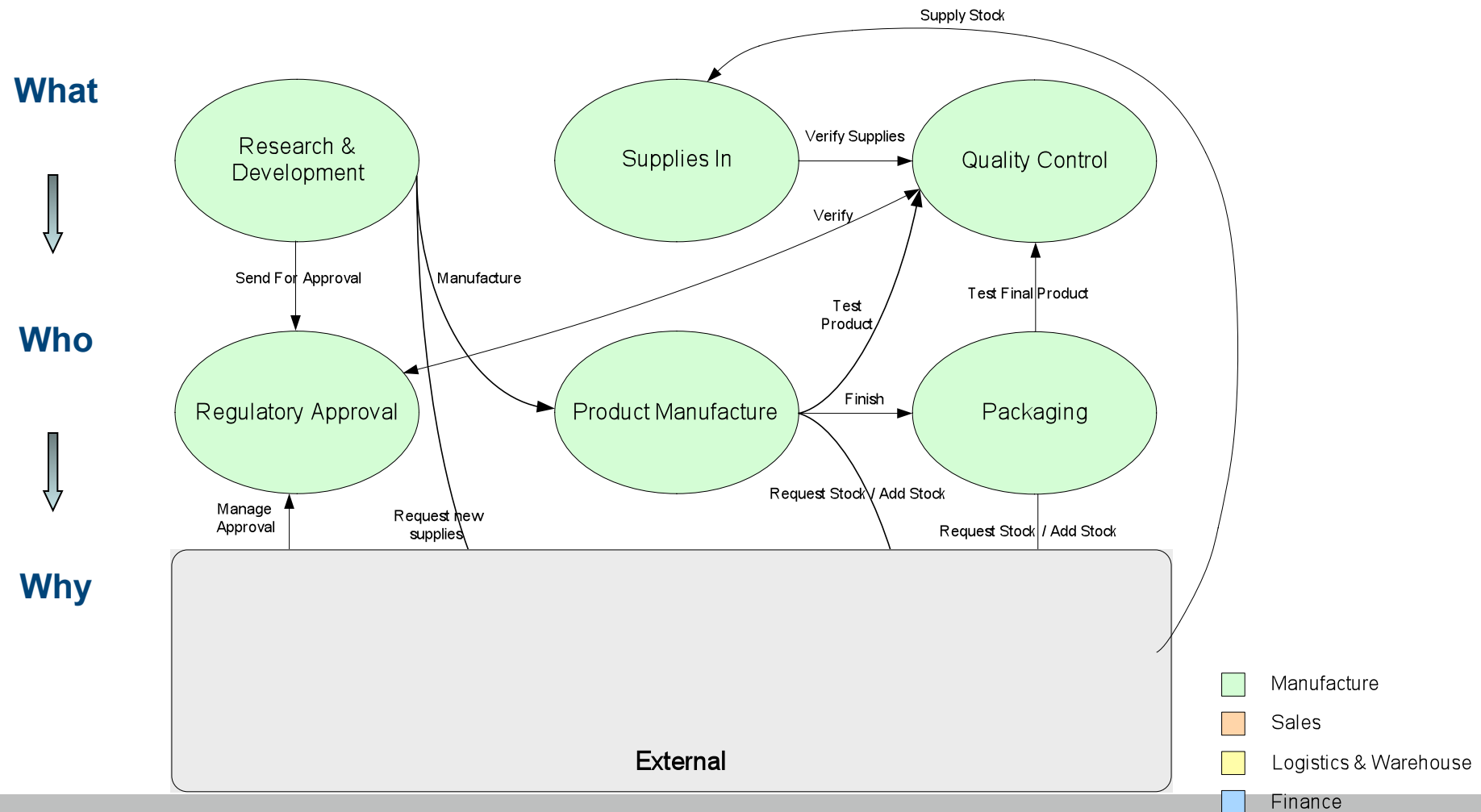
Level 1 Architecture

- **We reason in terms of “capabilities” (what can each area do?)**
- **Service analysis is carried out according to each Level 0 element identified before**
- **As a rule of thumb, a maximum of 8 Level 1 services for each Level 0, with a normal amount around 4.**



Top-down Service Analysis

Level 1 Architecture: Manufacture



Top-down Service Analysis

Level 2+ Architecture

Drilling down from Level 0 into lower abstraction level elements is a series of repetitions of the same steps.

Purposes:

1. to delve deeper and understand the problem domain more,
2. To identify “support” services



Top-down Service Analysis

Level 2+ Architecture

Support Services

- **Technology systems or business units that provide supporting functions necessary for the IT system to be delivered, e.g.**

Business Support Services (e.g. *HR, Desktop Support*):

Elements required only for the business to operate, not for the business operation of the system.

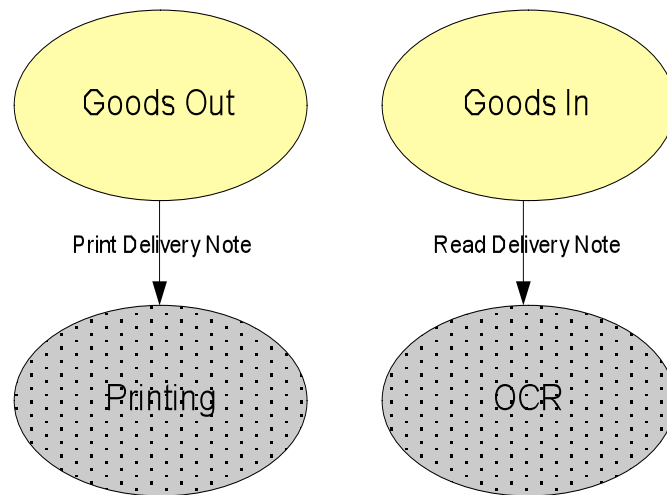
Technical Support Services (e.g. *hosting provider, printing service*):

Technical system that provides support to a business function, rather than being the specific business function themselves.

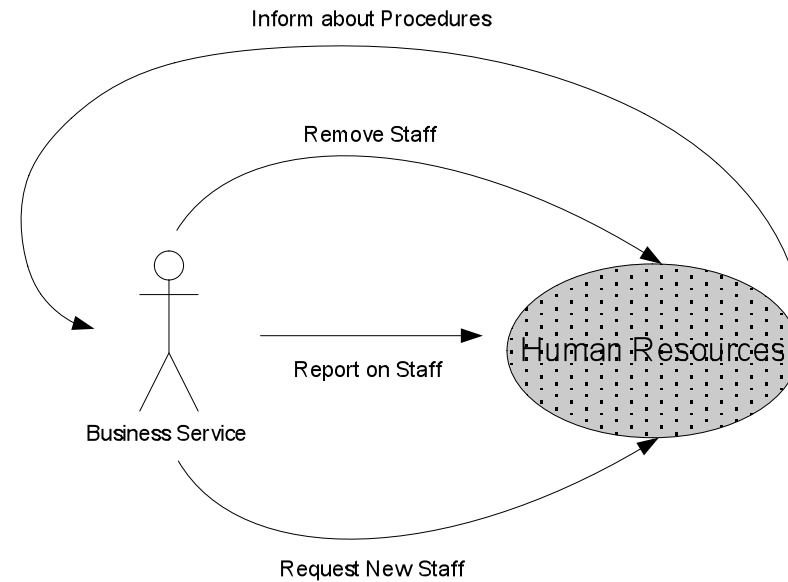


Top-down Service Analysis

Level 2+ Architecture: Support Services



Technical Support Services: Printing, OCR



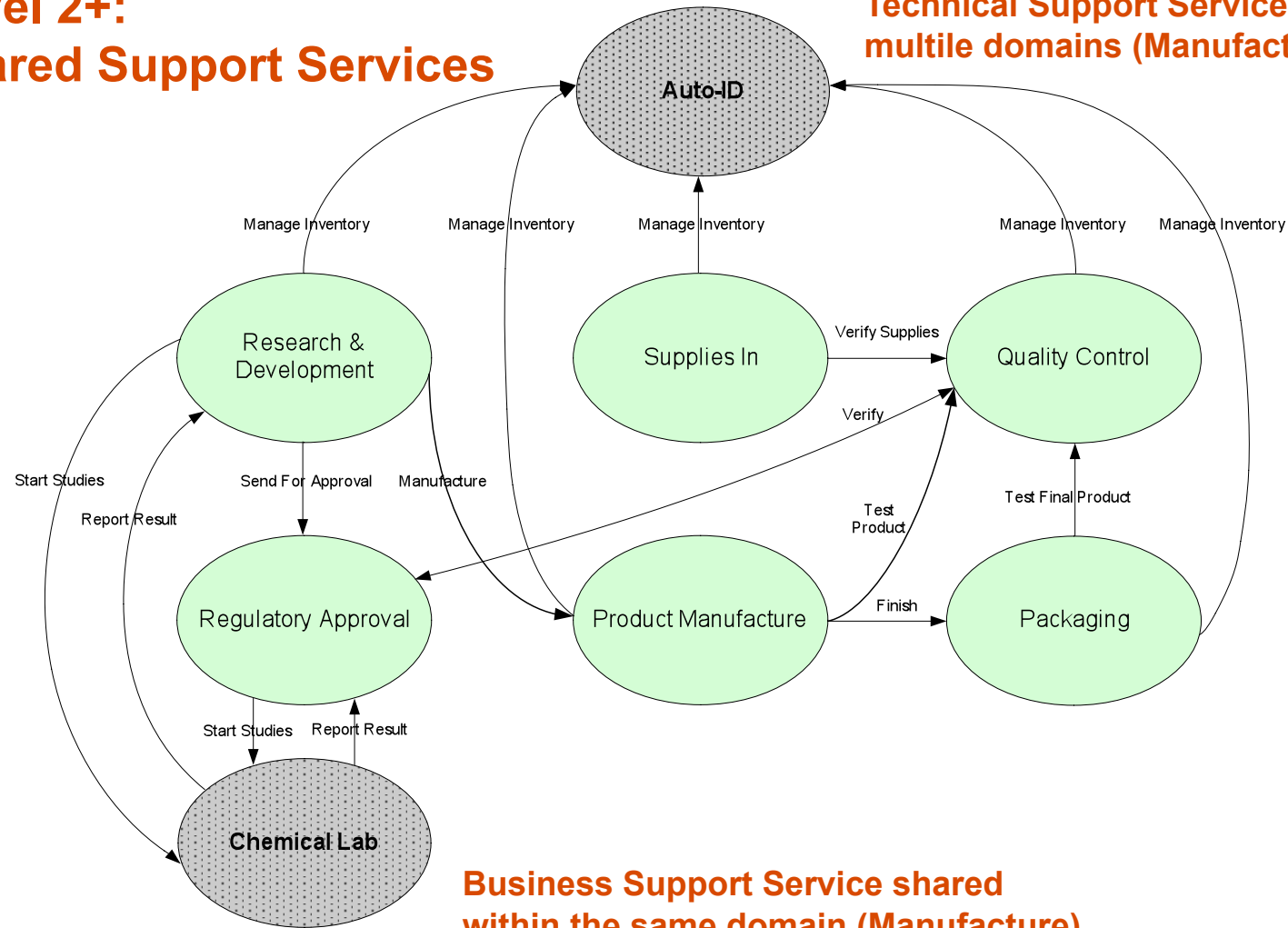
Business Support Service: Human Resources

- Manufacture
- Sales
- Logistics & Warehouse
- Finance

Top-down Service Analysis

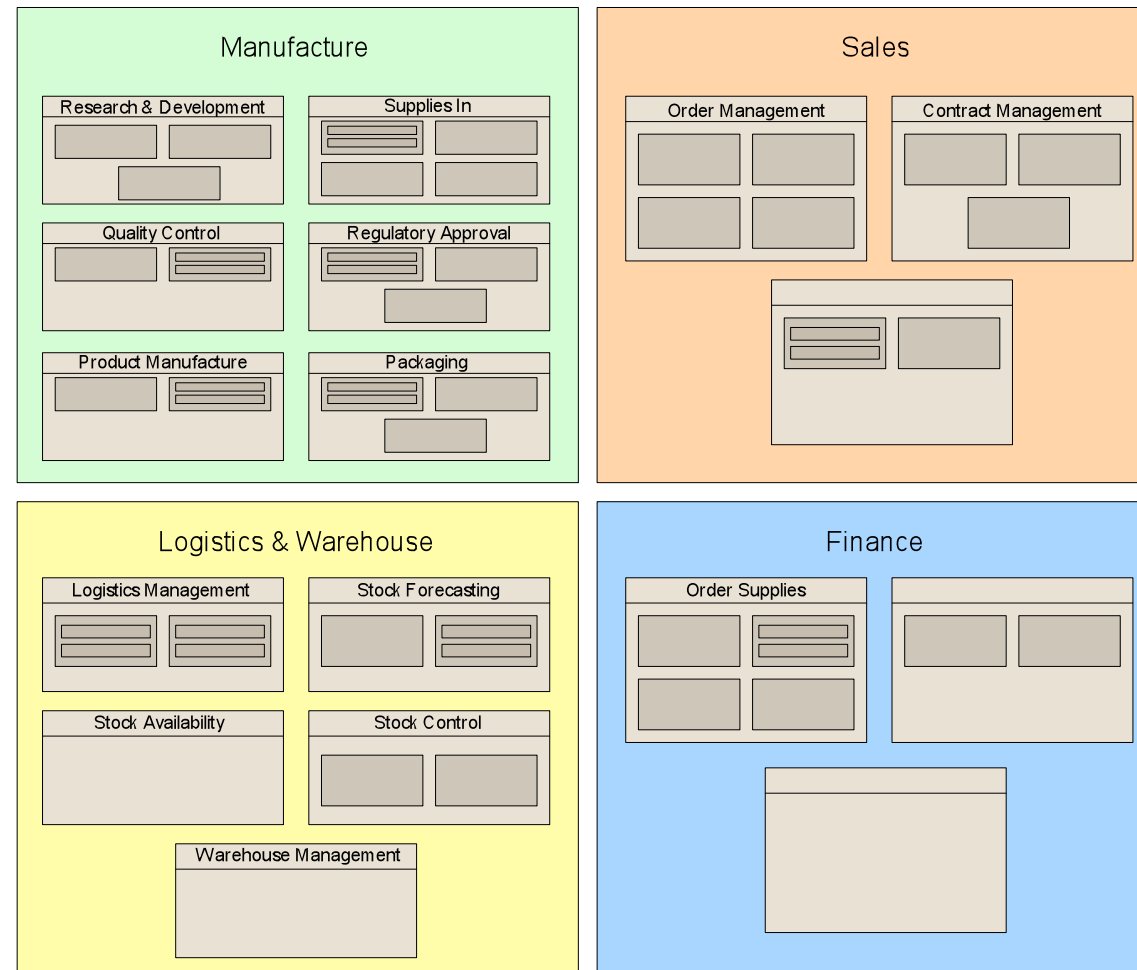
Level 2+: Shared Support Services

Technical Support Service shared across
multiple domains (Manufacture, Finance...)



Business Support Service shared
within the same domain (Manufacture)

Hierarchical Service Map



Let's get our hands dirty

- Classwork
 - Design a Level 0 Service Interaction Diagram for the Simplified loan application scenario
- Bonus Task (due on 31 October)
 - Design Level 0 and Level 1 Service Interaction Diagrams for the Swedish Electricity Market

References and acknowledgments

- Example used for top-down service analysis inspired by:
 - Steve Jones: “[Enterprise SOA Adoption Strategies](#)”. InfoQ, 2005.
- Reading of the week:
 - O. Zimmermann, V. Doubrovski, J. Grundler, K. Hogg:
[Service-oriented architecture and business process choreography in an order management scenario: rationale, concepts, lessons learned.](#)
OOPSLA Companion 2005: 301-312