

Instituto Superior Técnico

**Master Degree (MSc) in Information Systems and Computer
Engineering – Alameda**

**Architecture, Processes and Tools for Information Systems
2012 / 2013**

PROJECT

**Enterprise Architecture for RAREBOOKSCO
(Phase 2)**

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Introduction

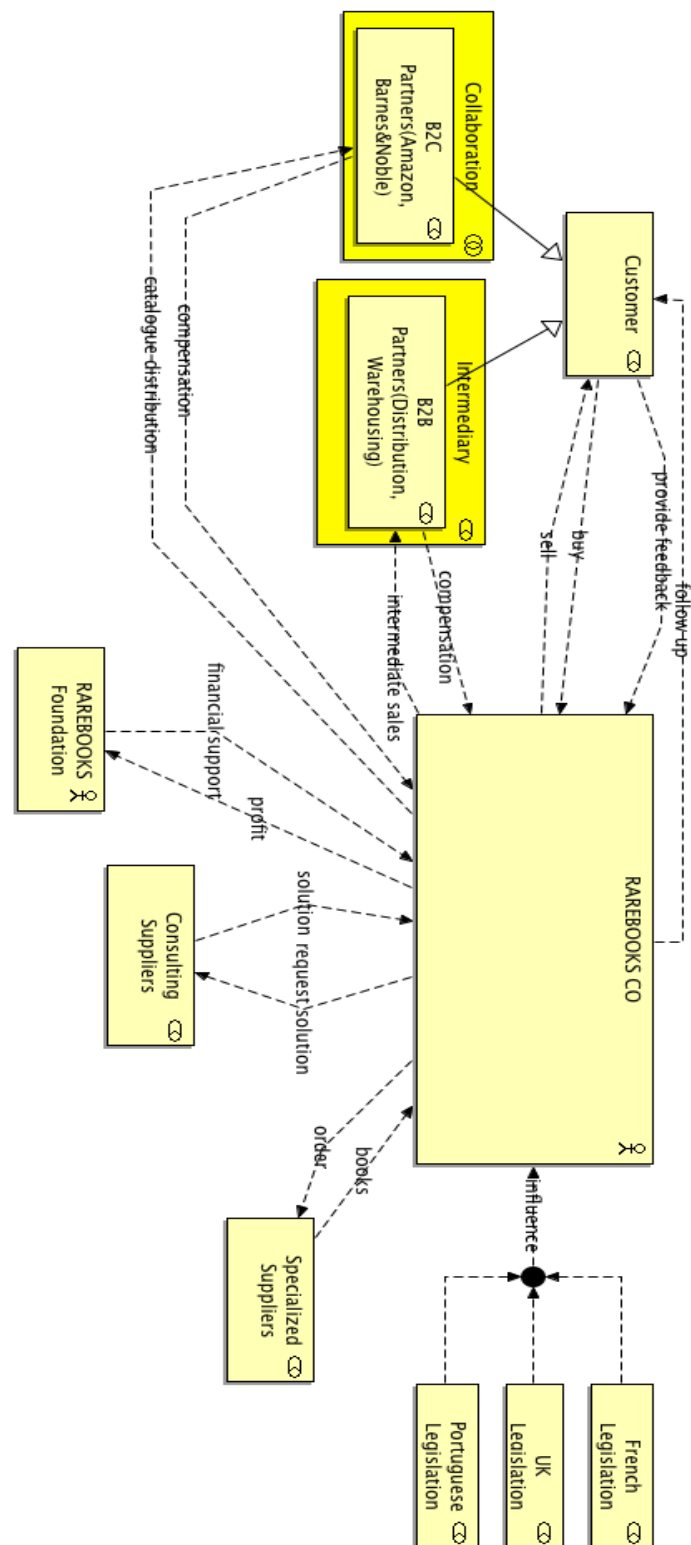
The purpose of this report is to present a proper Enterprise Architecture for RAREBOOKSCO in a way that its Business Processes don't have to be performed in an arbitrary way and also to clarify the automation possibilities of those processes when possible.

The effort in developing this architecture will provide a predictable saving source for the company, promoting alignment between the business layer, application layer, infrastructure layer and information layer.

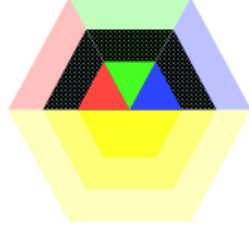
We will use the "Microsoft Dynamics Customer" model for the structuring of the processes and organic units of RAREBOOKSCO essentially because it is a relatively simple model. However, the services, processes and organic units referred in this report will be in accordance with the project scope, providing only high-level references to the remaining elements as a way of contextualization.

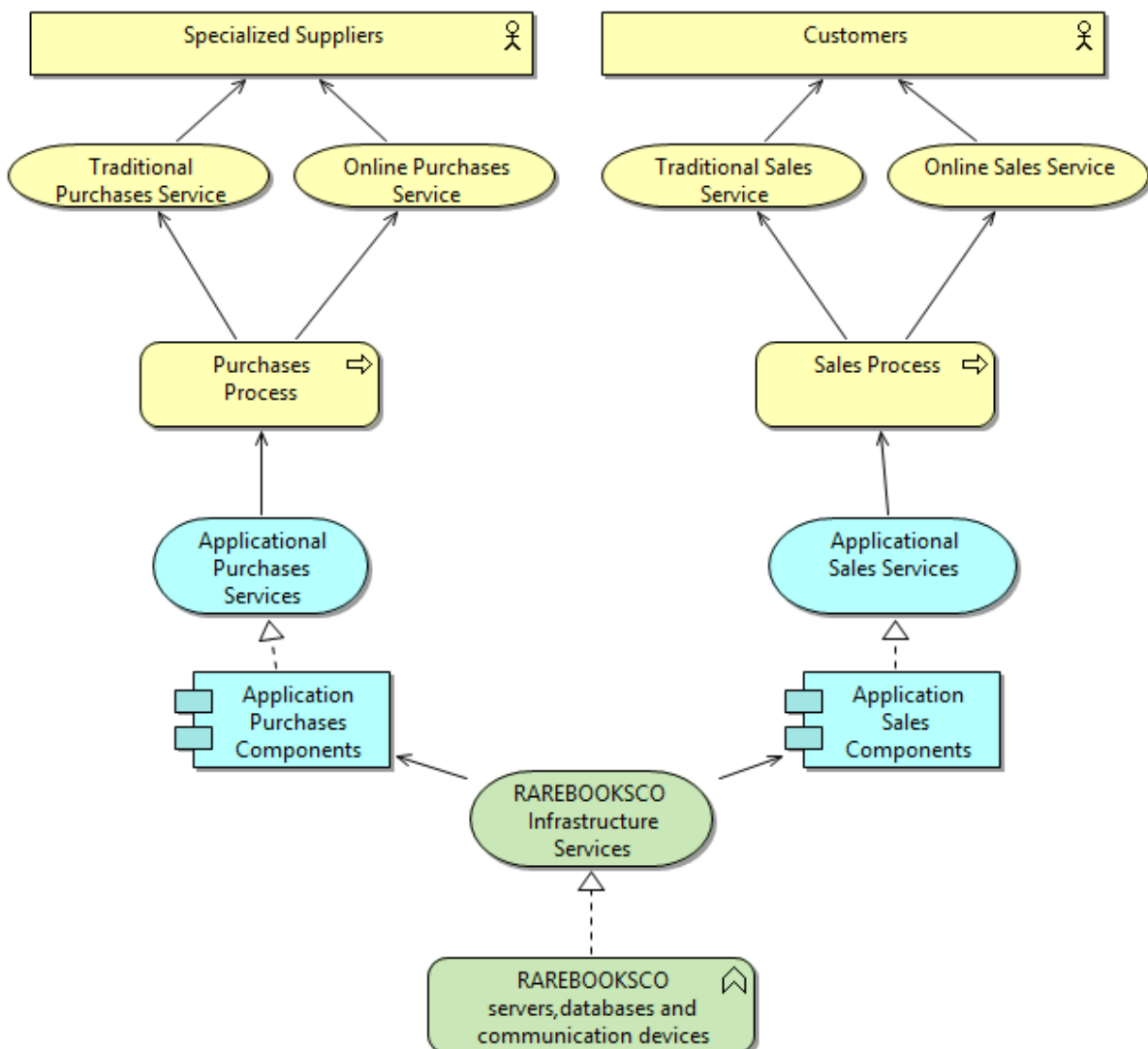
The design of this architecture models will be made with the support of ArchiMate, being the used viewpoints described in the "ArchiMate 2 specification – C118" document. Other modeling languages like BPMN 2.0 and UML 2.0 will also be used.

Artifact I – Context Diagram (Actor Cooperation)



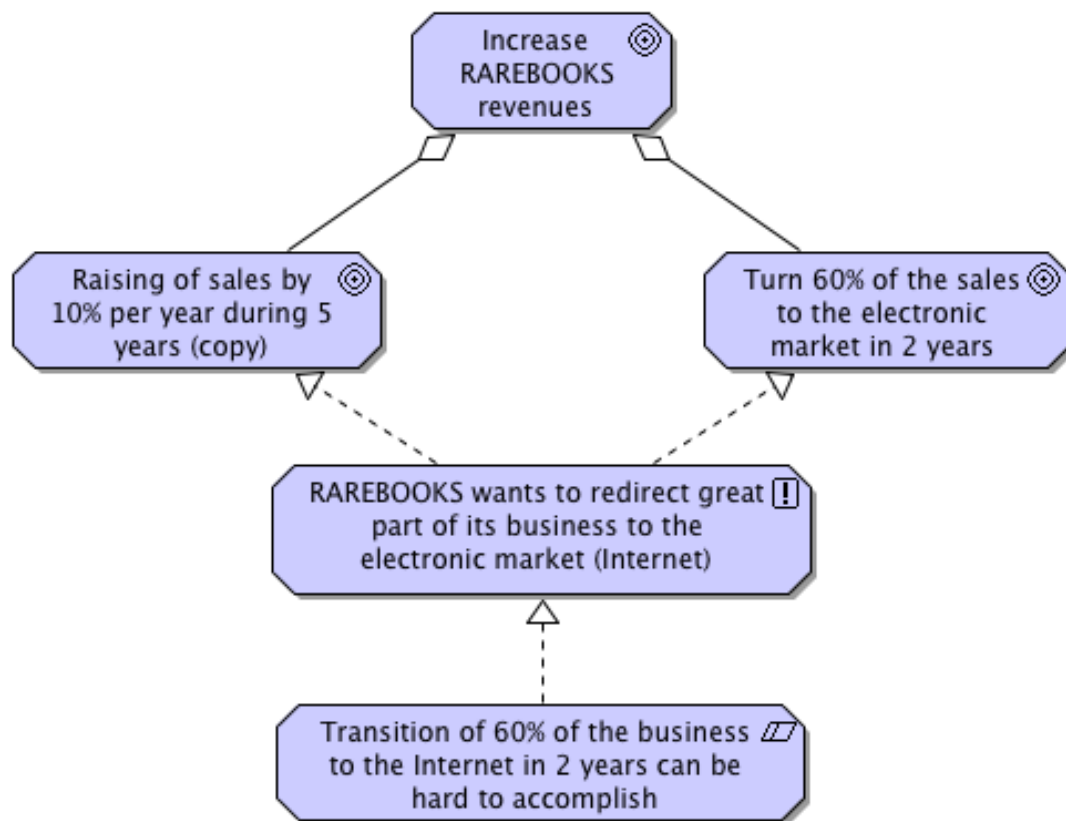
Artifact 2 – General View of the Enterprise Architecture (Organization Architecture)

Organization Architecture Viewpoint		
Stakeholders	Enterprise, process and domain architects, managers, employees	
Concerns	Identification of elements, responsibilities, interactions amongst them	
Purpose	Designing, deciding, informing	
Abstraction Level	Coherence	
Layer	Business Layer	
Aspects	Structure	

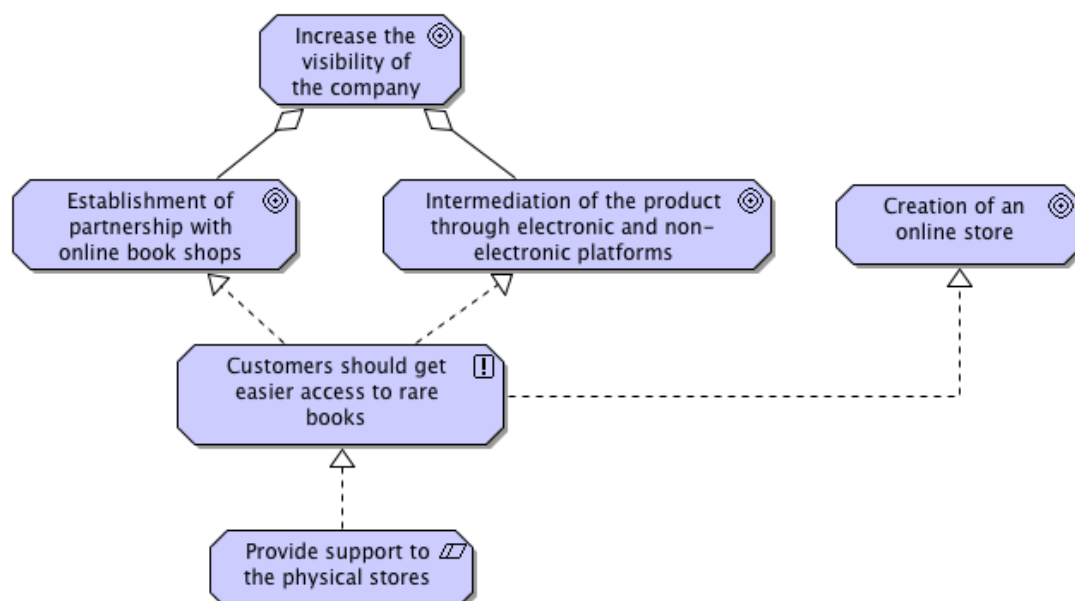


Artifact 3 – Strategic and Operational Objectives (Goal Refinement)

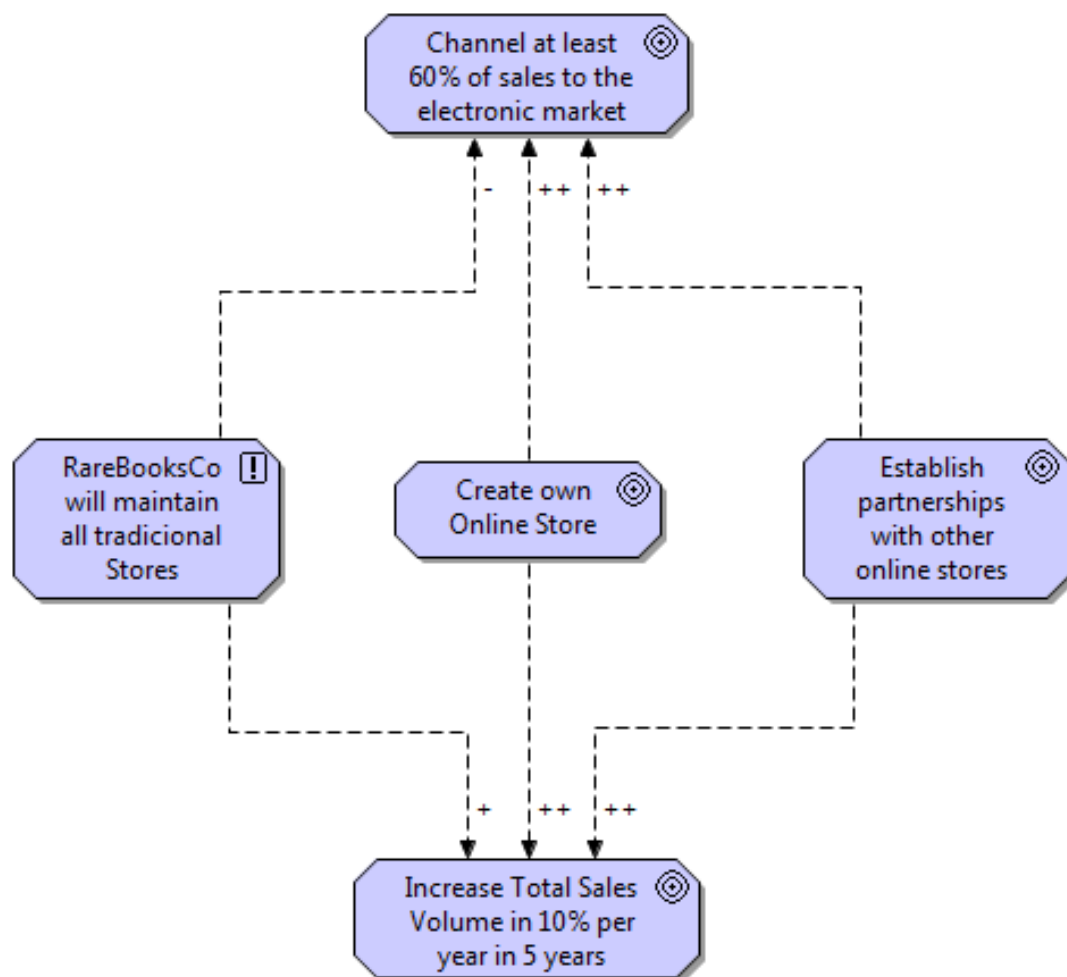
Strategic Objectives



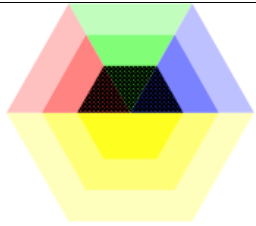
Operational Objectives

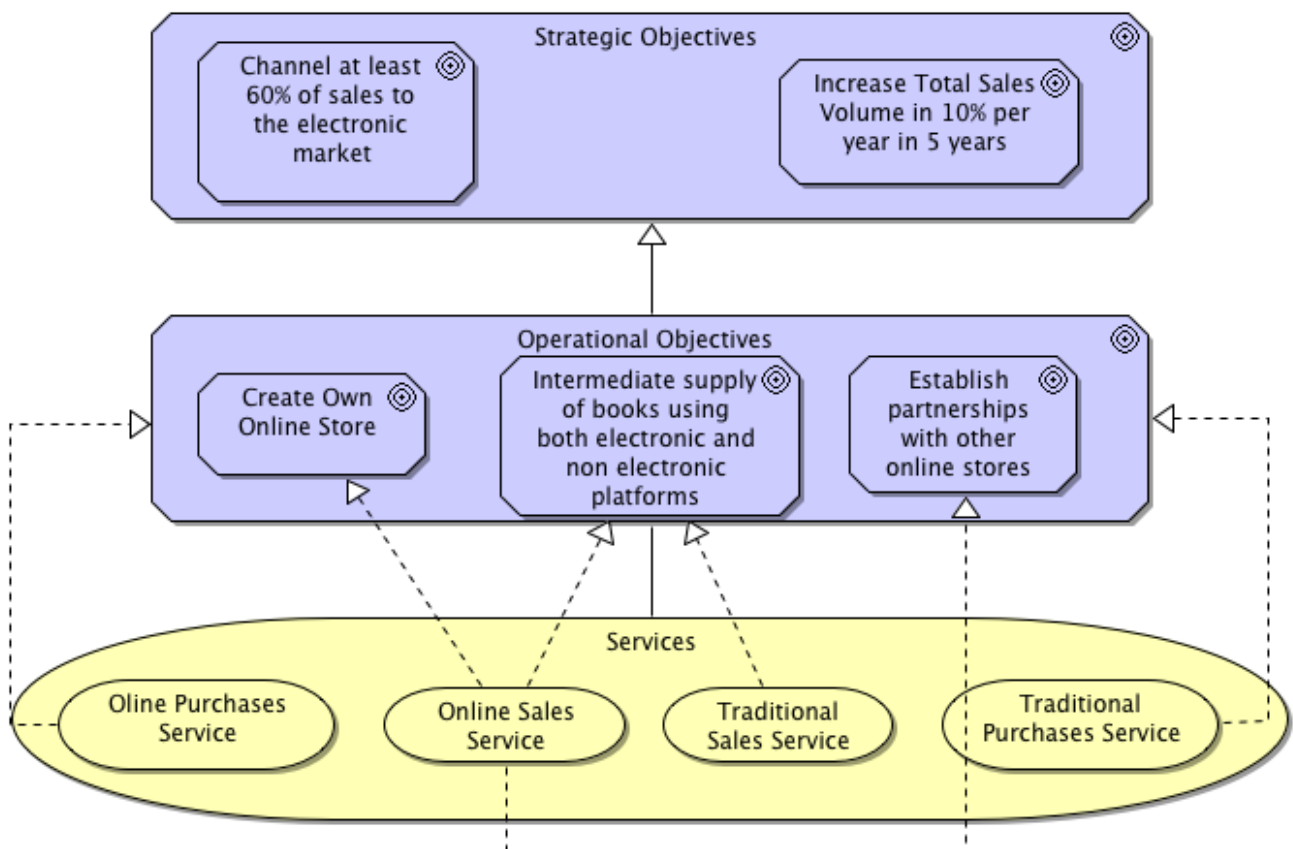


Artifact 4 – Contributes and Conflicts Between Objectives and Requisites For One of the Strategic Objectives (Goal Contribution)

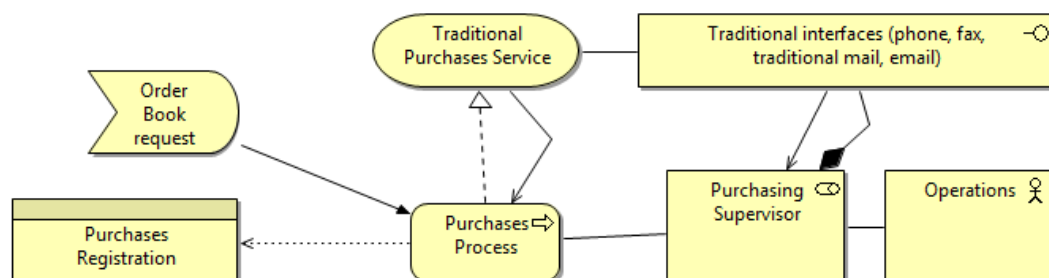
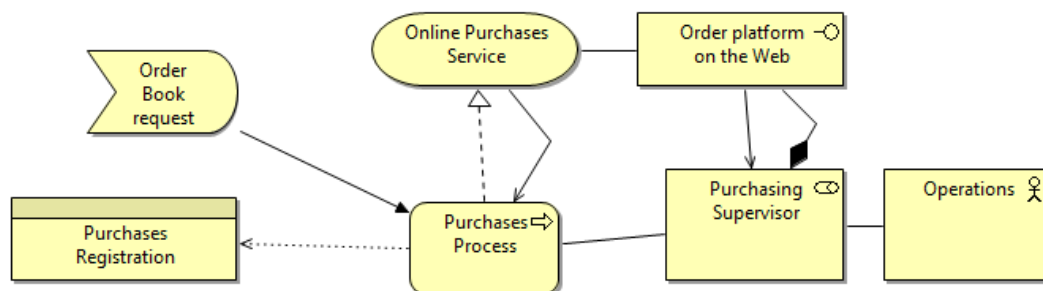
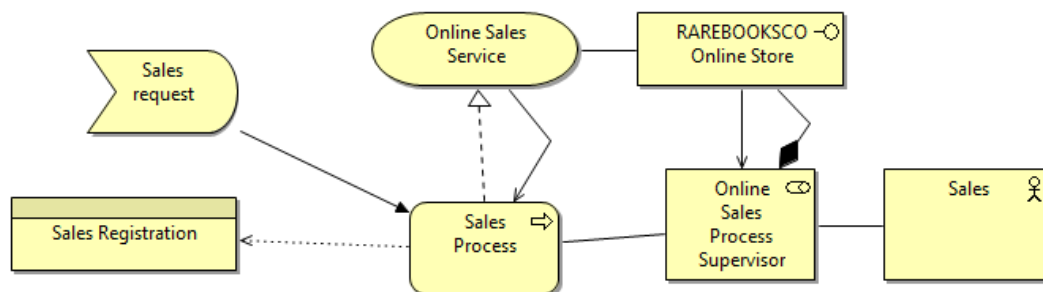
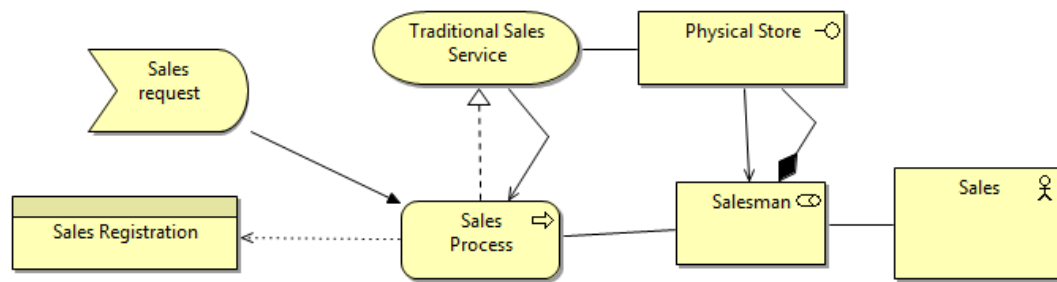


Artifact 5 – Relation Between the Business Services and the Strategic and Operational Objectives (Service-Objective Relation)

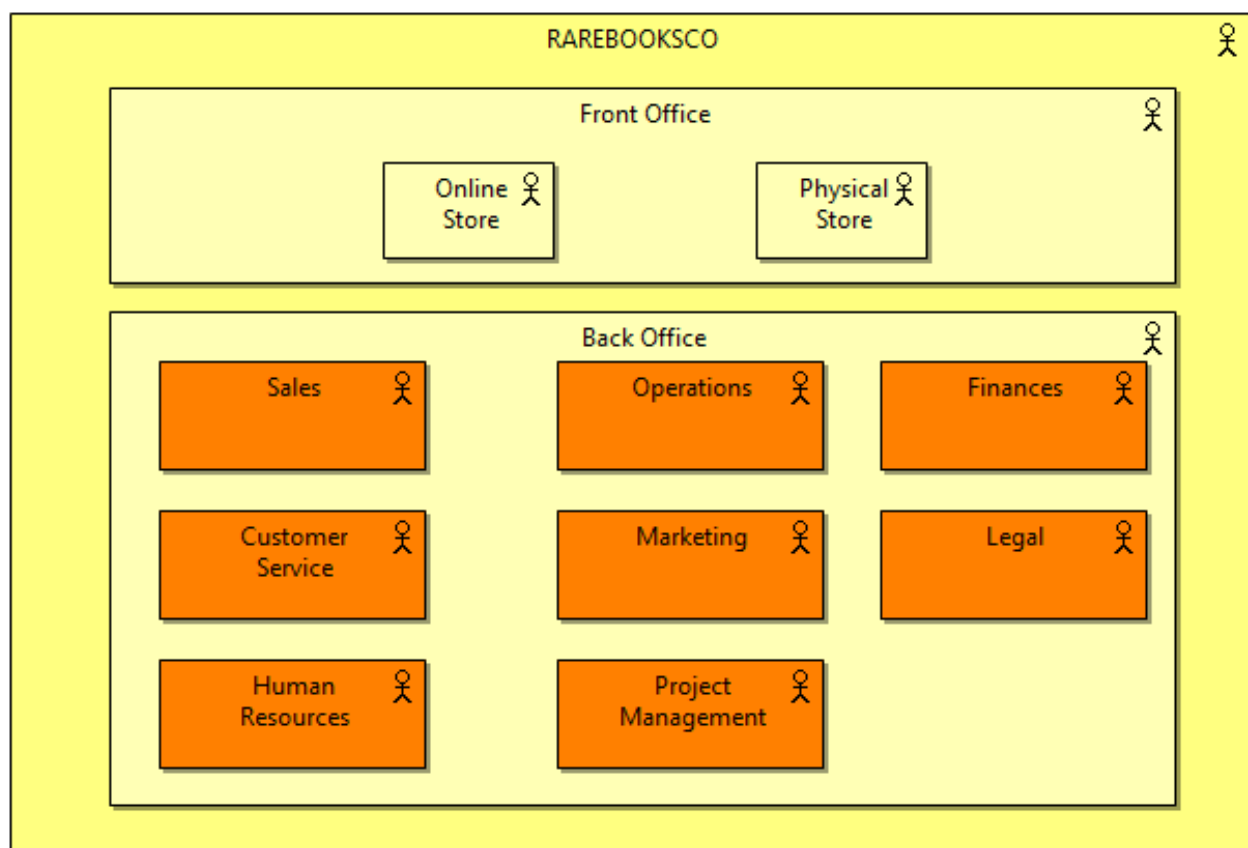
Service-Objective Relation Viewpoint		
Stakeholders	Enterprise, process, domain architects	
Concerns	Relationships of services with the strategic and operational objectives	
Purpose	Designing, deciding, informing	
Abstraction Level	Detail	
Layer	Business layer, application layer	
Aspects	Structure, behavior	




Artifact 6 – Business Products and Services (Product)

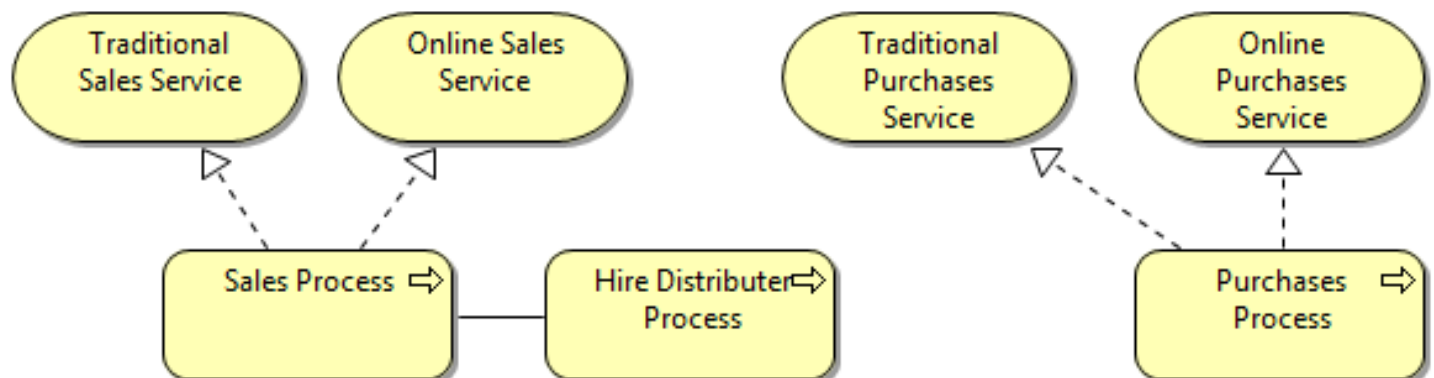


Artifact 7 – Organic Structure (Organization, Actor Cooperation)



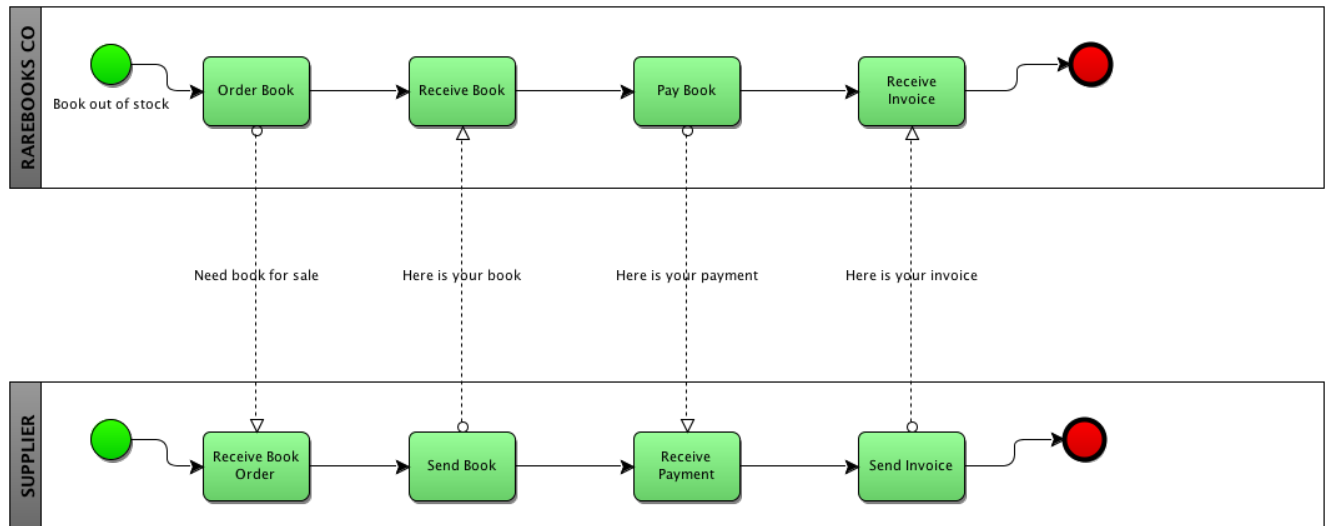
Artifact 8 – Relation Between the Business Services and the Business Processes (Business Process and Services Relation)

Business Process and Services Relation Viewpoint		
Stakeholders	Process and domain architects, operational managers	
Concerns	Relationship between business processes and services, consistency and completeness, responsibilities	
Purpose	Designing, deciding	
Abstraction Level	Coherence	
Layer	Business layer, application layer	
Aspects	Behavior	

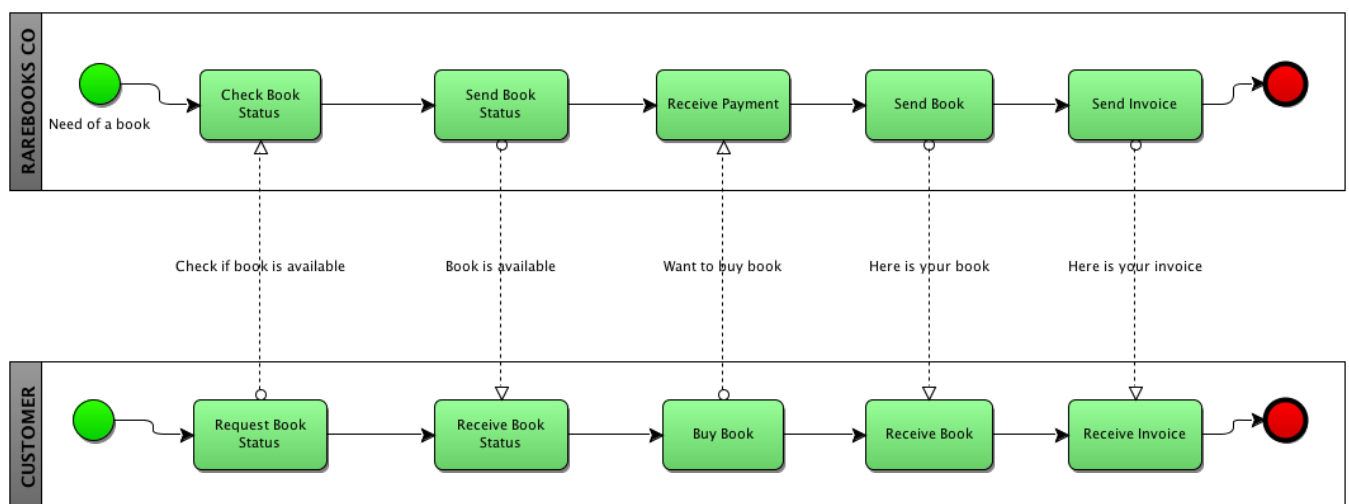


Artifact 9 – High Level Specification of the Business Processes at the Collaborative Level (Collaboration Diagram)

Purchase Process

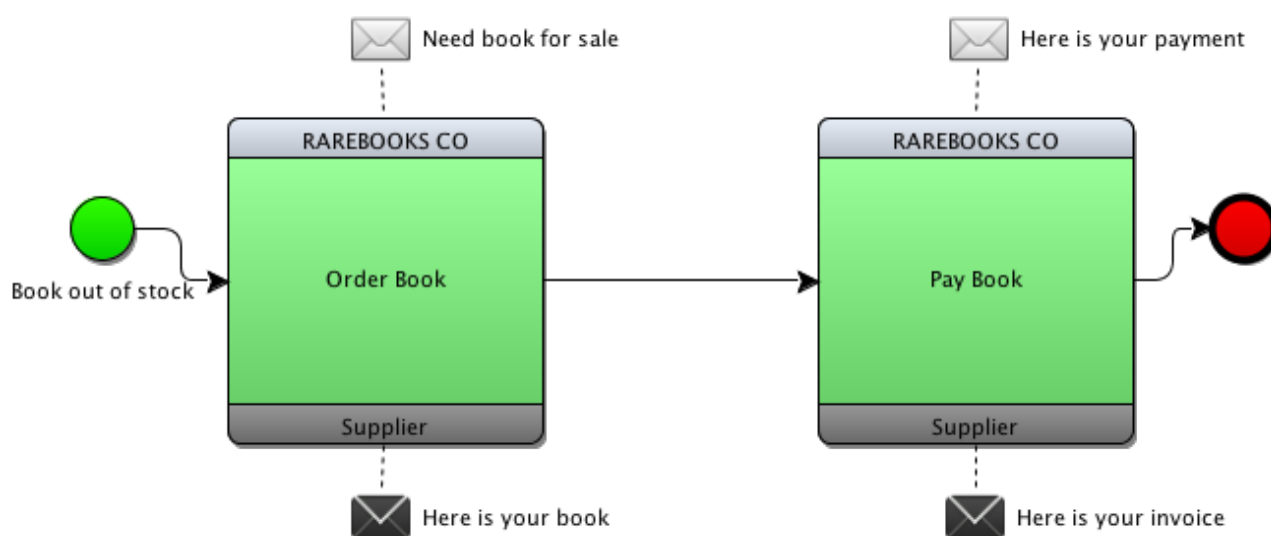


Sales Process

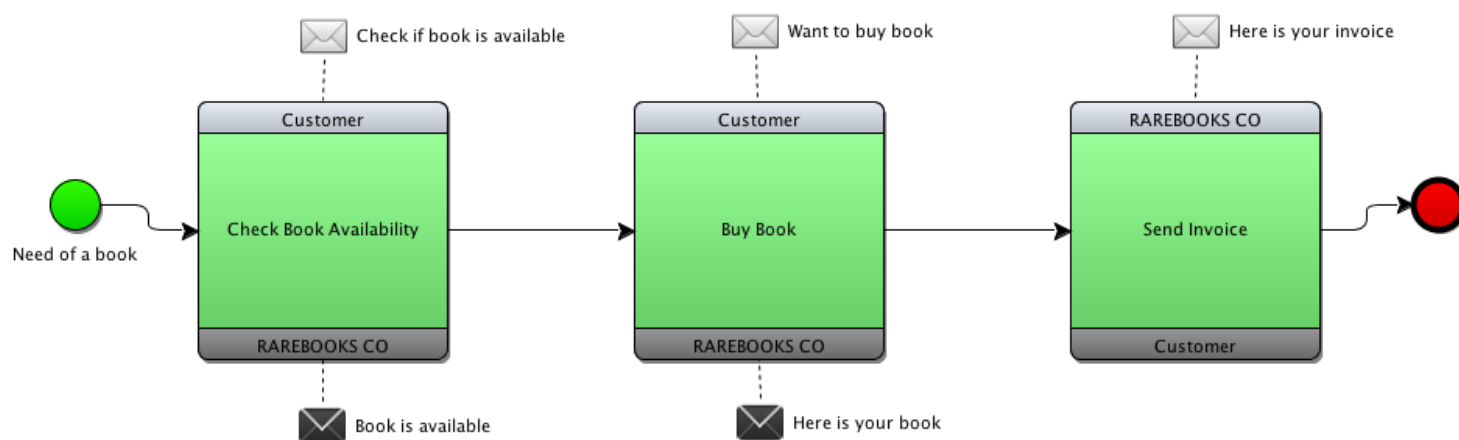


Artifact I0 – High Level Specification of the Business Processes at the Choreography Level Amongst Partners (Choreography Diagram)

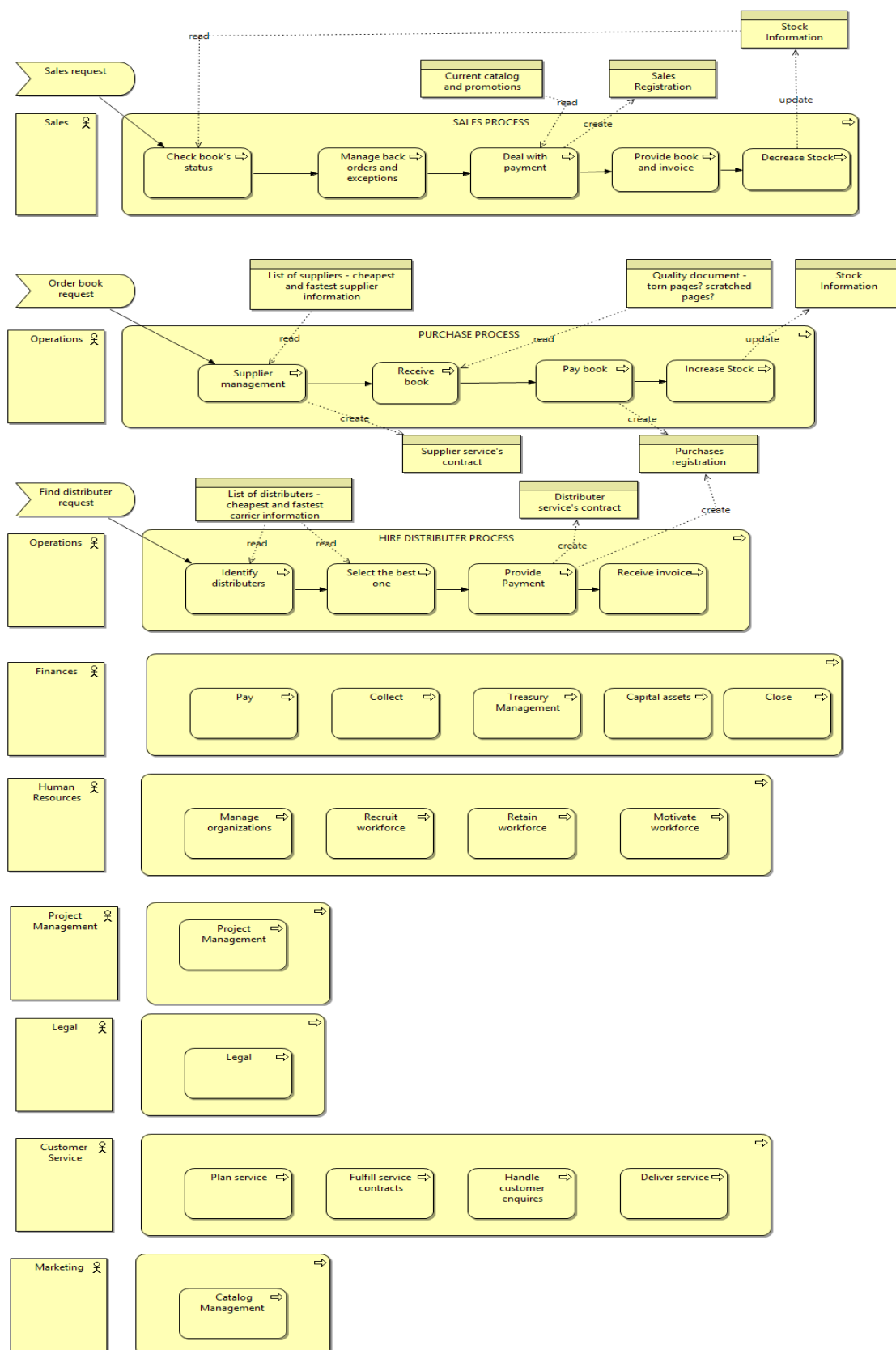
Purchases Process



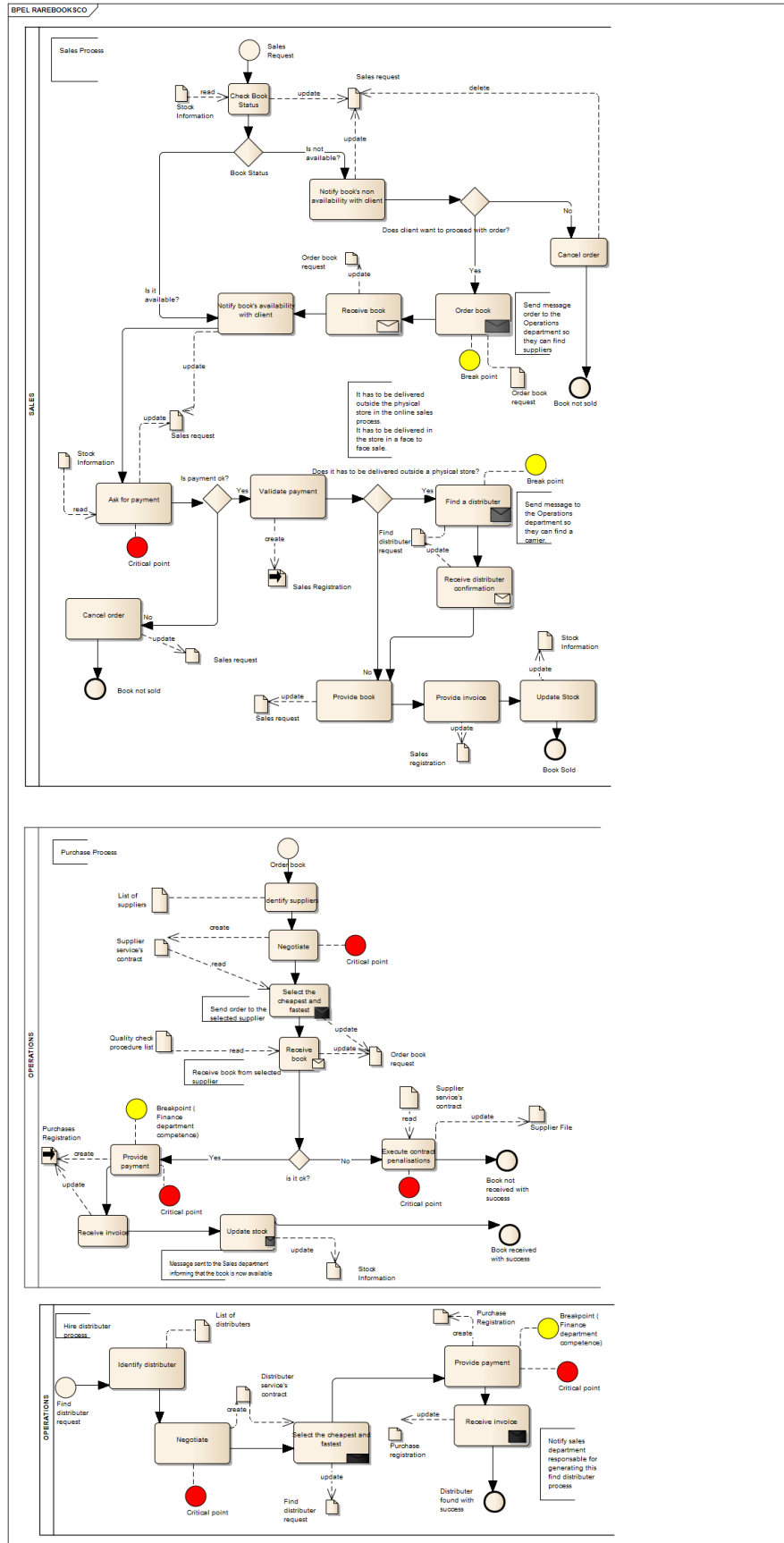
Sales Process



Artifact II – High Level Internal Specification of the Business Processes (Process Diagram)



Artifact I2 – Operational Internal Specification (Detailed) of the Business Processes (Process Diagram)



Artifact I3 – Critical Points of the Processes

Note! The Critical Points are represented in Artifact I2.

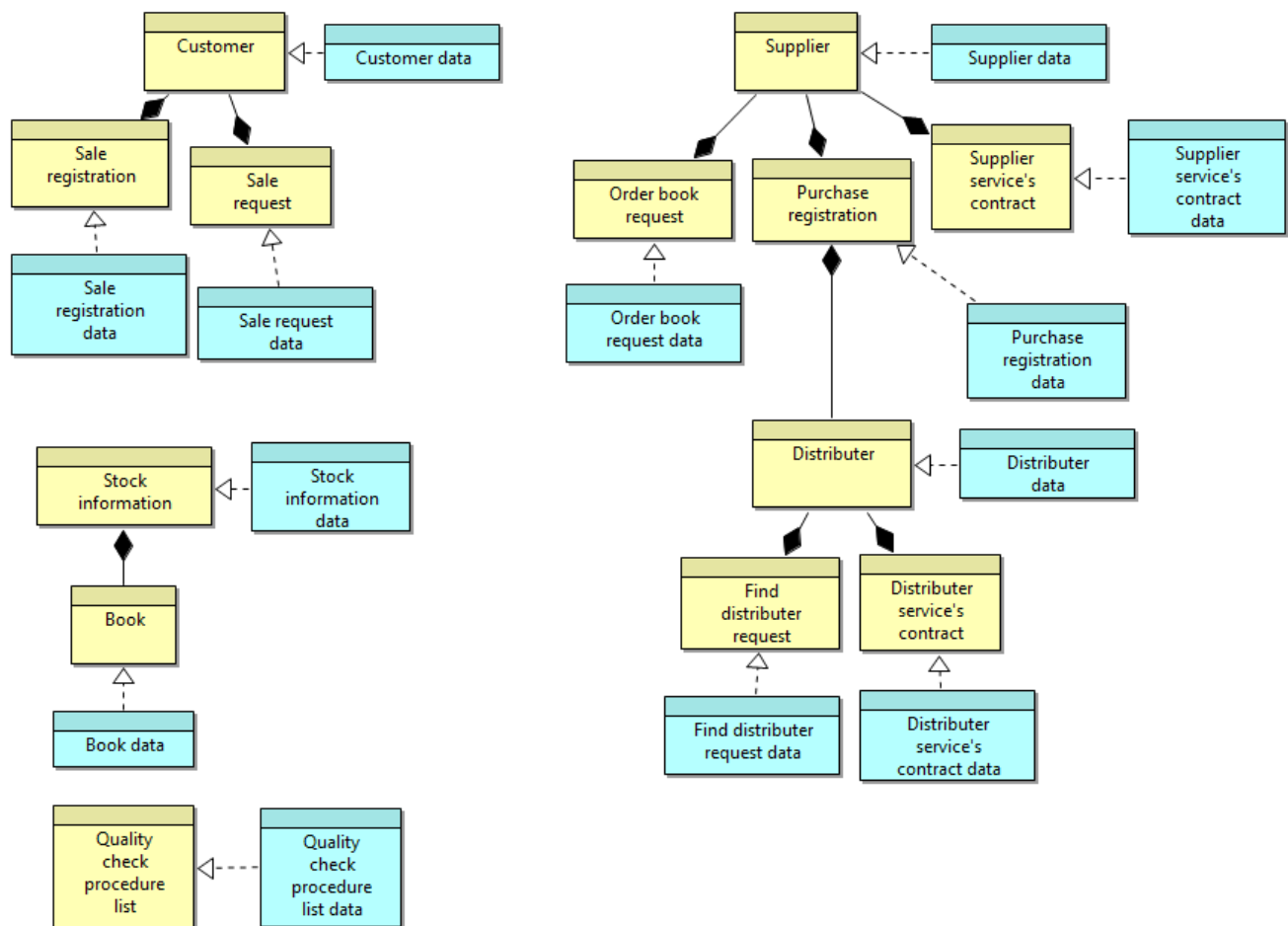
Artifact I4 – Breaking Points of the Processes

Note! The Breaking Points are represented in Artifact I2.

Artifact 15 – Informational Entities and Their Respective Classification According to Immon Taxonomies (Table)

Entity	Identifier	Primitive/Derived	Historical/Projected	Public/Private
Book	ISBN	Not Applicable	Not Applicable	Public
Customer	CustomerID	Not Applicable	Not Applicable	Private
Supplier	Name	Not Applicable	Not Applicable	Private
Distributor	Name	Not Applicable	Not Applicable	Private
Stock information	Name	Not Applicable	Historical	Public
Order book request	OrderBookRequestID	Primitive	Historical	Private
Purchase registration	PurchasesRegistrationID	Primitive	Historical	Private
Sale request	SalesRequestID	Primitive	Historical	Public
Sale registration	SalesRegistrationID	Primitive	Historical	Private
Find distributor request	FindDistributorRequestID	Primitive	Historical	Private
Supplier service's contract	SupplierServiceContractID	Primitive	Historical	Private
Distributor service's contract	DistributorServiceContractID	Primitive	Historical	Private
Quality check procedure list	Name	Not Applicable	Not Applicable	Private

Artifact I6 – Domain Model (Detailed) of the Informational Entities (Information Structure)



Artifact I7 – Specification of R-25 to R-32 questions based on artifact #I6

R-25. “What is the revenue associated with the sale of the book titled 'ABC' in 2012?”

This *query* can be answered through the information available in the Sales Registration informational entity created within the Sales process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the name of the book transacted, the price paid by the book and the date of the transaction.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those select the ones that refer to the book named 'ABC' and sum the resulted transactions according to the price paid field.

R-26. “What is the customer who bought more books to RAREBOOKSCO in 2012?”

This *query* can be answered through the information available in the Sales Registration informational entity created within the Sales process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the id of the customer that bought the book regarding that transaction and the date of the transaction.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those we can group them by the customer's id. The larger group corresponds to the customer that bought more books in 2012.

R-27. “What is the middleman who bought more books to RAREBOOKSCO in 2012?”

This *query* can be answered through the information available in the Sales Registration informational entity created within the Sales process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the date of the transaction, the customer's id and the customer's type that bought the book associated to that transaction which can be middleman or final.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those we can select just those that have the value middleman in the customer's type field. We group the resulted transactions by the customer's id and return the customer's id of the larger group.

R-28. “What is the vendor that supplied more books to RAREBOOKSCO in 2012?”

This *query* can be answered through the information available in the Purchase Registration informational entity created within the Purchase process (check artifact I2).

Purchases Registration is a table where the lines are purchase transactions. Each purchase transaction has several fields including the id of the supplier that sold the book regarding that transaction and the date of the transaction.

By making a constraint in the date field we can have all the purchase transactions of 2012. Then from those we can group them by the supplier's id. The larger group corresponds to the supplier that sold more books in 2012.

R-29. “What percentage of books sold through intermediaries in relation to all sales carried in 2012?”

This *query* can be answered through the information available in the Sales Registration informational entity created within the Sales process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the date of the transaction and the customer's type that bought the book associated to that transaction and which can have middleman and final as possible values.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those we

can select just those that have the value middleman in the customer's type field and count them. We then divide the number of transactions to middleman customers by the total number of transactions and get the percentage of books sold through intermediaries in 2012.

R-30. “What percentage of books sold electronically in 2012?”

This *query* can be answered through the information available in the Sales Registration informational entity created within the Sales process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the transaction's type which can have traditional and electronic as possible values.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those we can select just those that have the value electronic in the transaction's type field and count them. We then divide the number of electronic transactions by the total number of transactions.

R-31. “What is the average sales margin in 2012?”

This *query* can be answered through the information available in the Sales Registration and the Purchases Registration informational entities created within the Sales process and the Purchases process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the book's id, the price paid by the book and the date of the transaction. Purchases Registration is a table where the lines are purchase transactions. Each purchase transaction has several fields including the book's id, the id of the supplier that sold the book, the price paid by RAREBOOKS regarding that transaction and the date of the transaction.

By making a constraint in the date field we can have all the sale transactions of 2012. Then from those we can group them by the book's id and just consider the groups that have two transactions, one corresponds to the purchase transaction and the other corresponds to the sale transaction regarding the same book id. If we subtract the price paid to the supplier to the price of the sale in each group we get the profit grouped by book id. By making an average of the results we get the average sales margin in 2012.

R-32. “What percentage of books purchased in 2011 was sold in 2012 considering the total number of books purchased in 2011?”

This *query* can be answered through the information available in the Sales Registration and the Purchases Registration informational entities created within the Sales process and the Purchases process (check artifact I2).

Sales Registration is a table where the lines are sale transactions. Each sale transaction has several fields including the book's id and the date of the transaction. Purchases Registration is a table where the lines are purchase transactions. Each purchase transaction has several fields including the book's id and the date of the transaction.

By making a constraint in the date field we can have all the purchase transactions of 2011 and all the sale transactions of 2012. We then select just the sale transactions of 2012 where the book's id field appears in the book's id field of the 2011 purchase transactions. If we count them and divide them by the total number of 2011 purchase transactions we get the result.

Artifact I8 – Matrix with CRUD relations between entities and processes (processes x entity table)

Processes/Entities	Order book request	Suppliers	Distributors	Find distributor request	Stock information + Book	Sale request + Customer	Purchase registration	Sale registration	Supplier service's contract + Distributer service's contract	Quality check procedure list
Provide payment							CRUD			
Receive invoice							RU			
Validate payment								CRUD		
Provide invoice								RU		
Find a distributor				CRUD						
Receive distributor confirmation				RU						
Select the cheapest and fastest	RU	R	R	RU						
Order book	CRUD									
Receive book	RU									R
Identify suppliers		CRUD								
Execute contract penalizations		RU	RU						R	
Identify distributor			CRUD							
Update stock					CRUD					
Check Book Status + Ask for payment					R	RU				
Notify book's non availability with client + Notify book's availability with client + Provide book						RU				
Cancel order						CRUD				
Negotiate									CRUD	

Systems:
 Purchases Registry System (Dist & Suppliers)

 Sales Registry System

 Service Providers Management System

 Purchases Monitoring System

 Sales Monitoring System

 Service Contract Management System


Artifact 19 – CRUD Matrix with application identification and dependencies. Applications should be identify using BSP method (processes x entity table)

Processes/Entities	Order book request	Suppliers	Distributers	Find distributor request	Stock information + Book	Sale request + Customer	Purchase registration	Sale registration	Supplier service's contract + Distributer service's contract	Quality check procedure list
Provide payment							CRUD			
Receive invoice							RU			
Validate payment								CRUD		
Provide invoice								RU		
Find a distributor				CRUD						
Receive distributor confirmation				RU						
Select the cheapest and fastest	RU	R	R	RU						
Order book	CRUD									
Receive book	RU									R
Identify suppliers		CRUD								
Execute contract penalizations		RU	RU						R	
Identify distributor			CRUD							
Update stock					CRUD					
Check Book Status + Ask for payment					R	RU				
Notify book's non availability with client + Notify book's availability with client + Provide book						RU				
Cancel order						CRUD				
Negotiate									CRUD	

Systems:


 Purchases Registry System (Dist & Suppliers)

 Sales Registry System

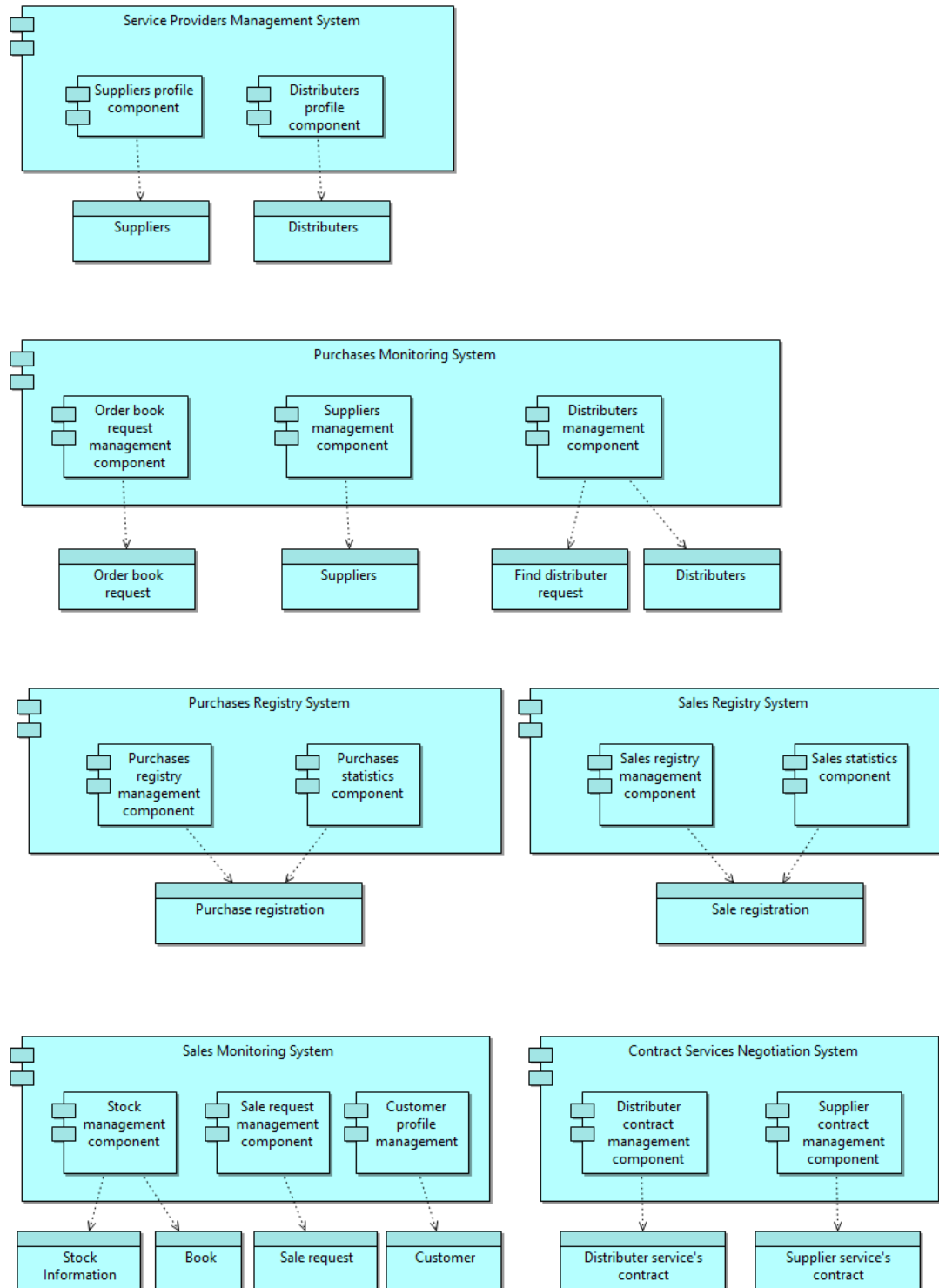
 Service Providers Management System

 Purchases Monitoring System

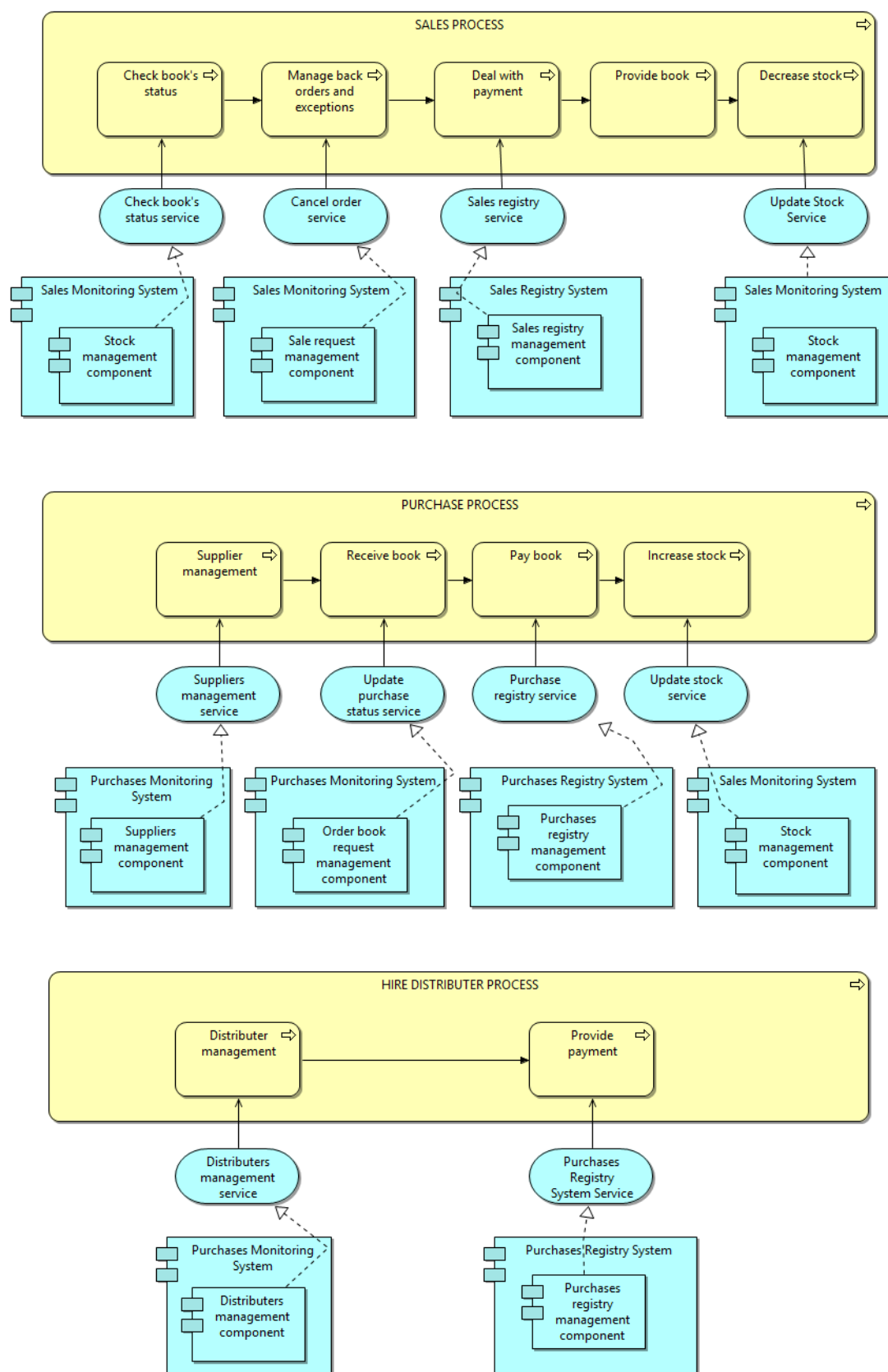
 Sales Monitoring System

 Service Contract Management System

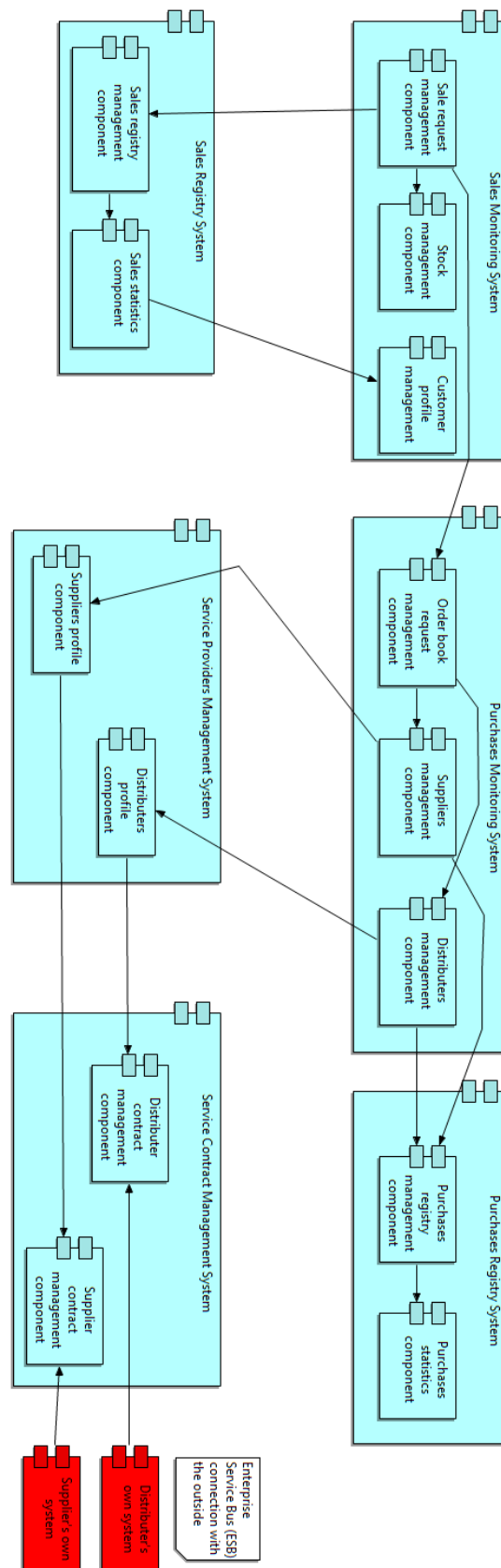
Artifact 20 – Application architecture (Application Structure)



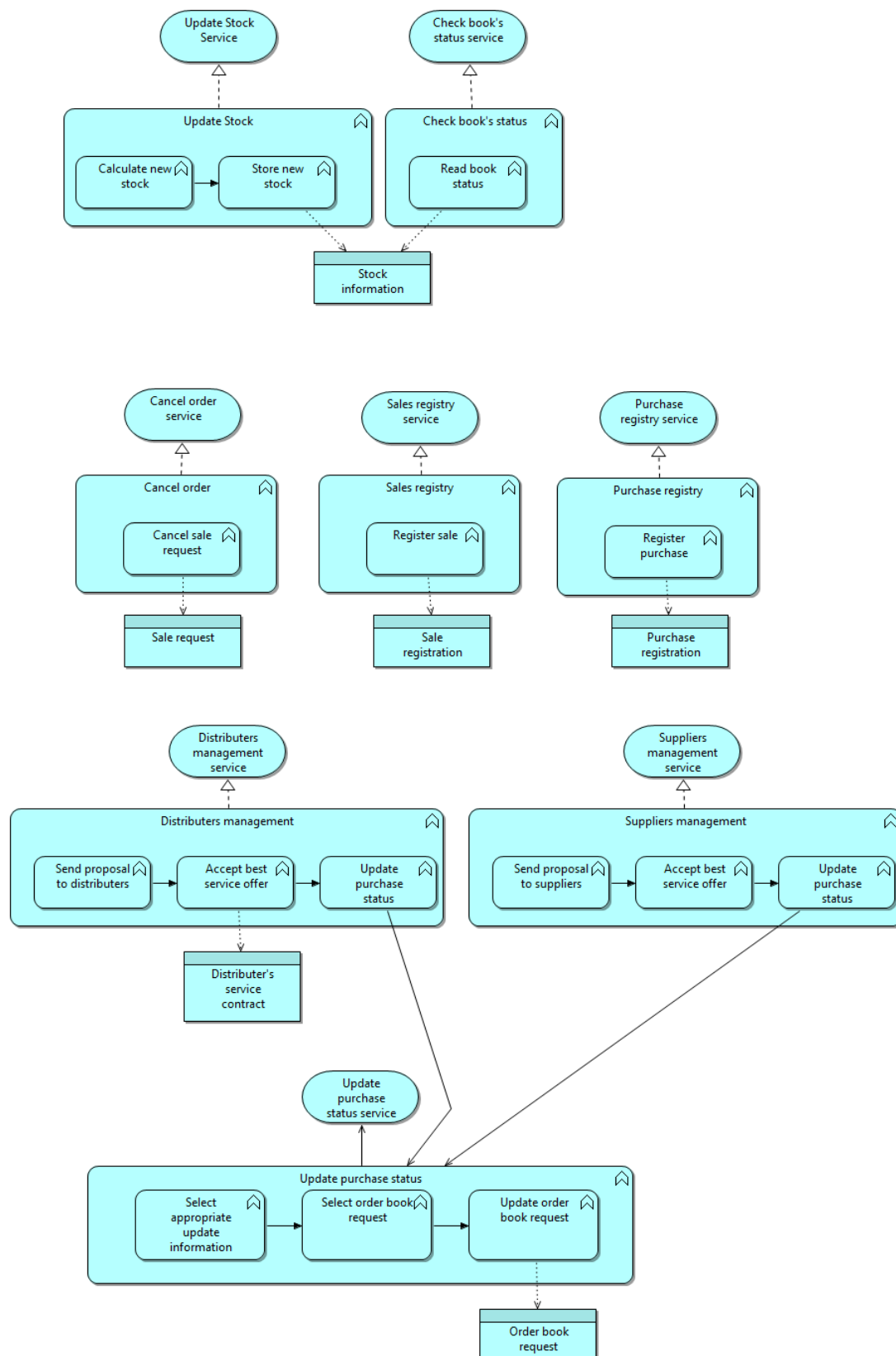
Artifact 2I – Application architecture (Application Usage)



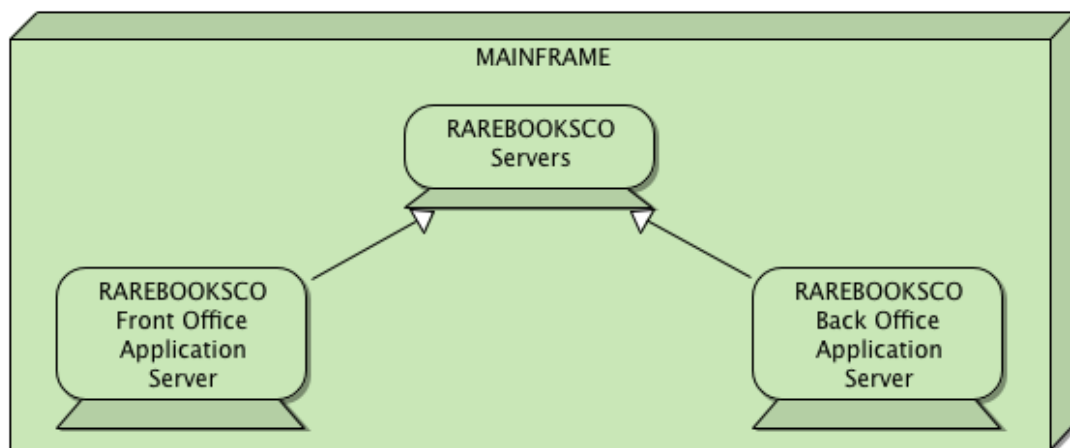
Artifact 22 – Application architecture (Application Cooperation)



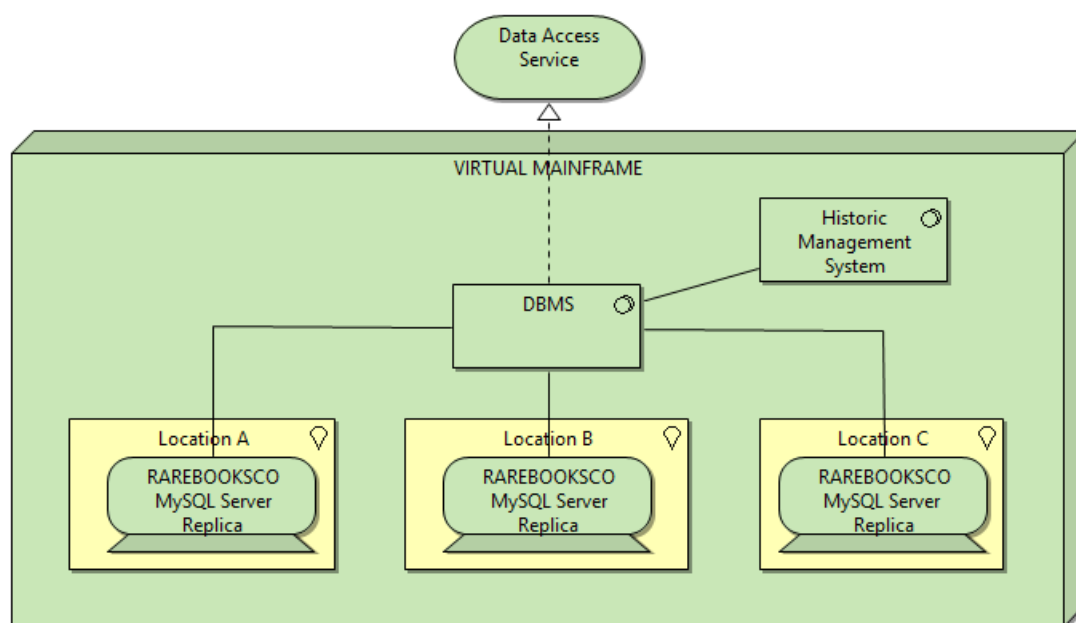
Artifact 23 – Application architecture (Application Behavior)



Artifact 24 – Processing infrastructure (Infrastructure)

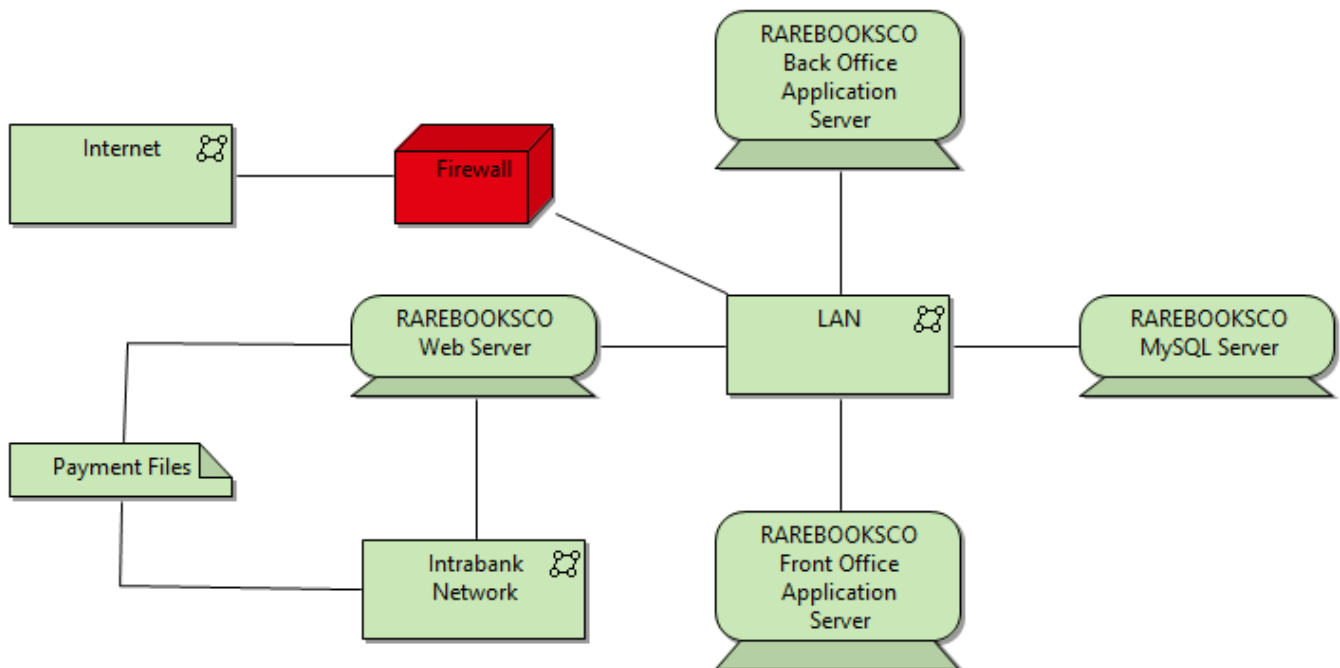


Artifact 25 – Storage infrastructure (Infrastructure)



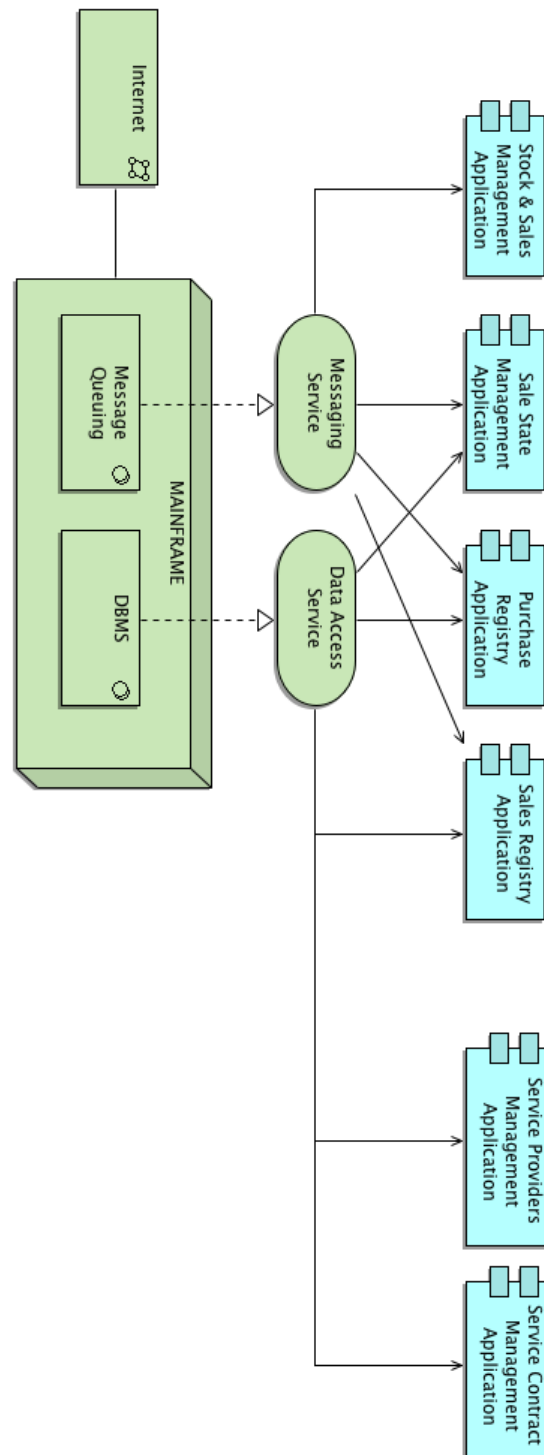
- Applications responsible for inventory management and suppliers share the same database. (R-44)
- Historic Management System. (R-49)

Artifact 26 – Communication infrastructure (Infrastructure)

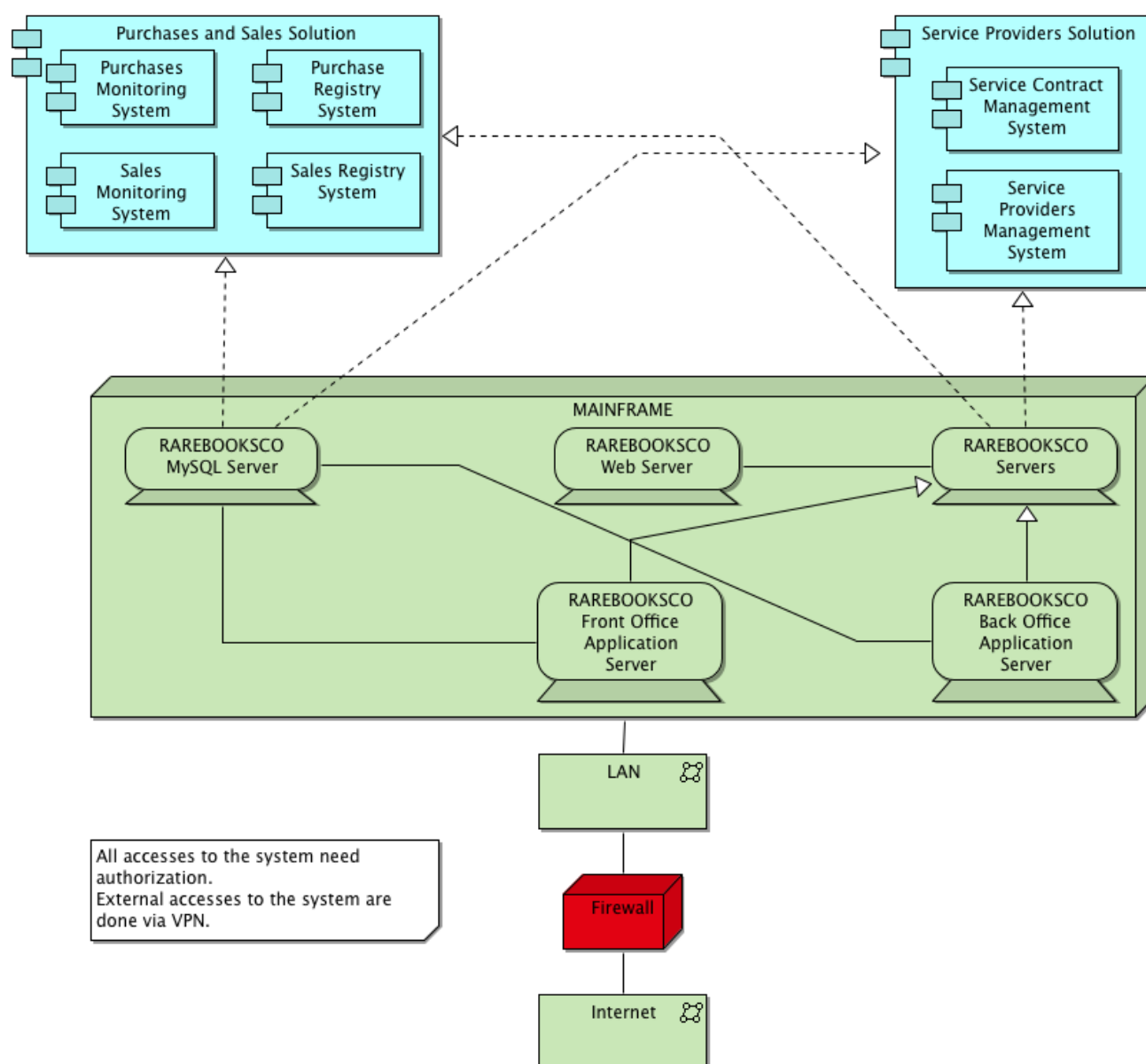


- The artifact payment files is transferred to the interbank network daily with payments from online customers. (R-42)
- When a payment is made in a traditional store it opens a synchronous communication, encrypted, and with guaranteed delivery of the payment between the terminal and interbank network. (R-43)

Artifact 27 – Relation between infrastructure and applications (Infrastructure Usage)



Artifact 28 – Deploy of applications in the infrastructure (Implementation & Deployment)



Artifact 29 – Main Decisions and Limitations Taken Into Consideration

- We used the “ArchiMate 2 specification” document to elaborate the ArchiMate viewpoints.
- The processes and departments are modeled based on the “Microsoft Customer Model” document;
 - In the Artifact 5, the Online Purchases Service and the Traditional Purchases Service are related with the increase total sales volume strategic objective because if we have purchase services that deal with more competent suppliers (and distributors) we are contributing to get more satisfied customers either by providing better quality books or delivering those books faster, increasing in this way the sales volume.
- In the Artifact 6, we are only considering the most important services for the company in our opinion. We could complement the artifact with all the services corresponding to the interactions between RAREBOOKSCO and the context entities presented in the Artifact 1, for example the catalogue distribution service.
- In the Artifact 12 we just detail the processes that are relevant in the context of this project although we have given an overview of the other processes in the Artifact 11.
- The Artifacts 13 and 14 are represented in the Artifacts 12 because the break points and critical points are clearer if they are represented in the BPMN diagram in our opinion.
- The Artifact 21 relates the applications with the high-level business processes description of Artifact 11.
- The Artifacts 24 and 25 only show a part of the infrastructure (processing and storage respectively) being the relation between them shown in the next Artifacts.
- The Artifact 28 relates the applications stated in the previous artifacts with the infrastructures specified also in the previous artifacts. Here we tried to make a simplification of the RAREBOOKSCO MAINFRAME just stating the main interactions between the main infrastructures of the business.