

UNIVERSIDAD MARIANO GÁLVEZ DE GUATEMALA

FACULTAD DE INGENIERIA EN SISTEMAS DE INFORMACIÓN Y CIENCIAS DE LA  
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EXAMEN FINAL

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# INTRODUCCIÓN

## 1. CONTEXTO

Plataforma de Control de Pedidos Multiplataforma

Tecnologías: Next.js + Spring Boot + Maven + MariaDB + PostgreSQL

La empresa MultiPedidos S.A. administra pedidos de distintos clientes y proveedores en varias regiones.

Por políticas internas y requerimientos técnicos:

- › El módulo de Clientes y Pedidos debe operar en una base MariaDB (infraestructura regional).
- › El módulo de Proveedores y Facturación debe operar en una base PostgreSQL (infraestructura corporativa).
- › Ambos módulos deben compartir una lógica de negocio común (cálculos, validaciones y descuentos) implementada en una librería Maven compartida.

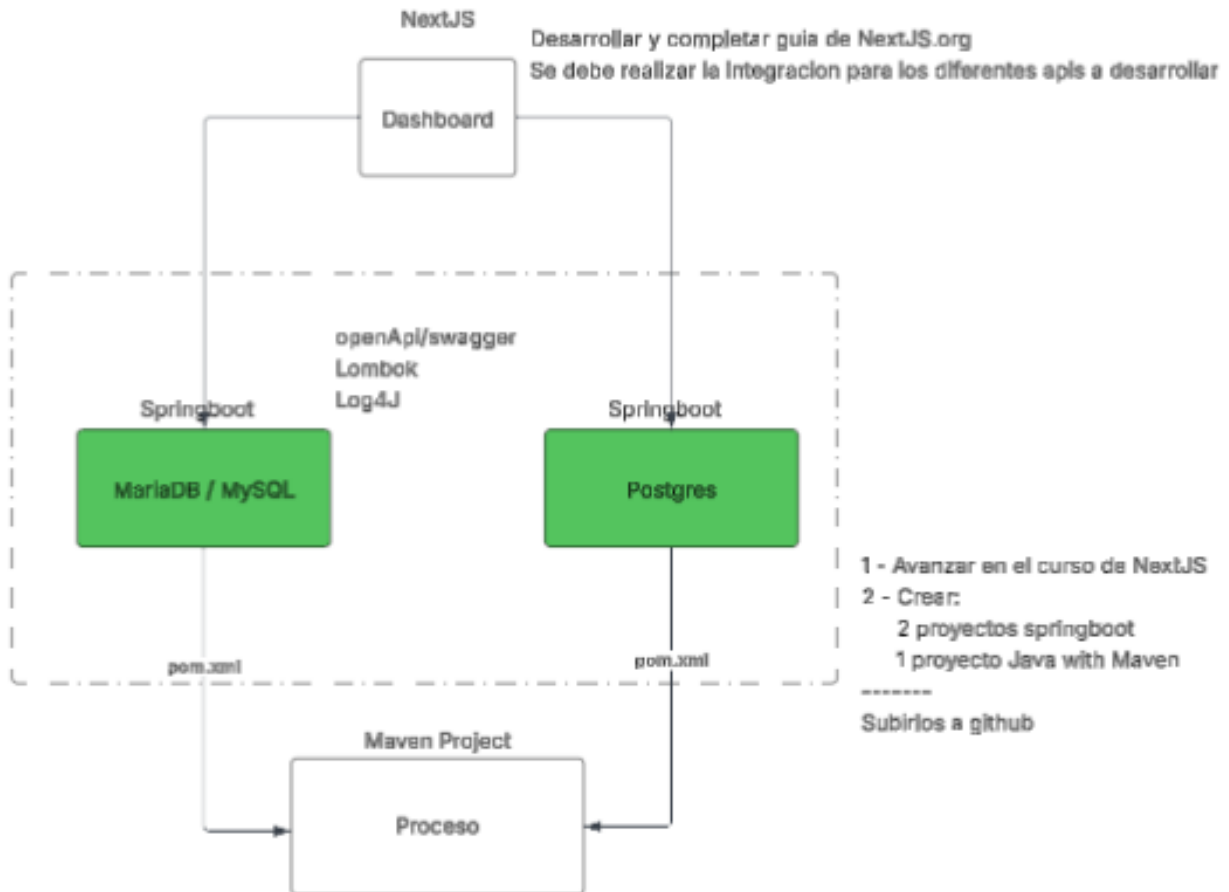
El Dashboard en Next.js será el panel administrativo que muestre información combinada proveniente de ambos servicios.

## 2. Objetivo General

Diseñar e implementar una solución completa con arquitectura distribuida, integrando:

- › Un frontend web en Next.js (tutorial oficial de [Next.org](https://nextjs.org)).
- › Dos microservicios Spring Boot independientes con persistencia en bases de datos distintas.
- › Un proyecto Maven reutilizable que funcione como dependencia común para ambos microservicios.

El propósito es que los estudiantes piensen como arquitectos de software, definan la comunicación entre componentes, la lógica compartida y la integración de datos en una arquitectura modular.



### 3. Tecnologías implementadas

- Backend: Spring Boot 3.5.7 con Java 17
- Bases de datos: MariaDB y PostgreSQL
- Frontend: Next.js 16 con React 19 y TypeScript
- Gestión de dependencias: Maven
- Documentación API: OpenAPI/Swagger

### 4. Arquitectura

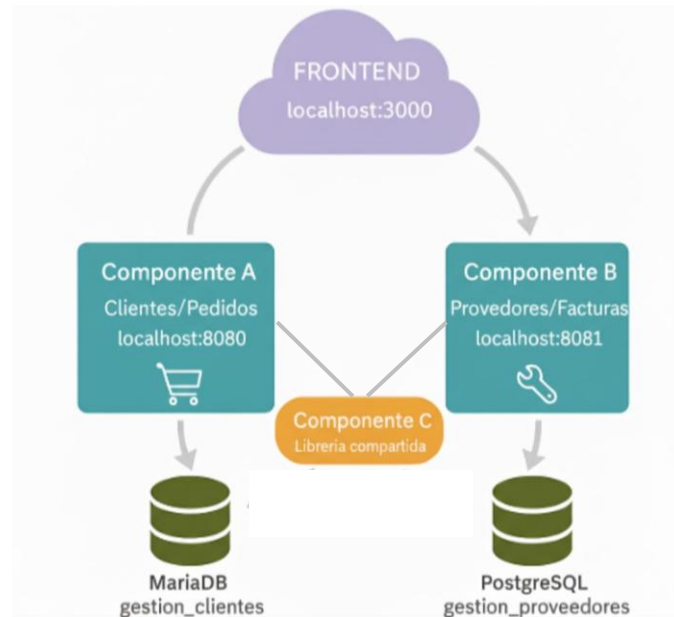
#### 4.1. Diagrama de Arquitectura

Dashboard (Next.js) → consume APIs REST → Componente A + B

Componente A (8080) → MariaDB

Componente B (8081) → PostgreSQL

Ambos usan → Componente C (librería compartida)



## 5. COMPONENTE A - CLIENTES Y PEDIDOS

### 5.1. Configuración

Dependencias: Spring Boot 3.5.7, JPA, Web, MariaDB, OpenAPI, componente-c

```

componente-a > pom.xml
1  <?xml version="1.0" encoding="UTF-8"?>
2  <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
4  <modelVersion>4.0.0</modelVersion>
5  <parent>
6  <groupId>org.springframework.boot</groupId>
7  <artifactId>spring-boot-starter-parent</artifactId>
8  <version>3.5.7</version>
9  <relativePath/> <!-- lookup parent from repository -->
10 </parent>
11 <groupId>com.empresa.a</groupId>
12 <artifactId>componente-a</artifactId>
13 <version>0.0.1-SNAPSHOT</version>
14 <name>componente-a</name>
15 <description>Demo project for Spring Boot</description>
16 <url/>
17 <licenses>
18 <license/>
19 </licenses>
20 <developers>
21 <developer/>
22 </developers>
23 <scm>
24 <connection/>
25 <developerConnection/>
26 <tag/>
27 <url/>
28 </scm>
29 <properties>
30 <java.version>17</java.version>
31 </properties>
32 <dependencies>
33 <dependency>
34 <groupId>org.springframework.boot</groupId>
35 <artifactId>spring-boot-starter-data-jpa</artifactId>
36 </dependency>
37 <dependency>

```

```

componente-a > pom.xml
 2  <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
32  <dependencies>
36      </dependency>
37      <dependency>
38          <groupId>org.springframework.boot</groupId>
39          <artifactId>spring-boot-starter-web</artifactId>
40      </dependency>
41
42      <dependency>
43          <groupId>org.mariadb.jdbc</groupId>
44          <artifactId>mariadb-java-client</artifactId>
45          <scope>runtime</scope>
46      </dependency>
47      <dependency>
48          <groupId>org.springframework.boot</groupId>
49          <artifactId>spring-boot-starter-test</artifactId>
50          <scope>test</scope>
51      </dependency>
52  <dependency>
53      <groupId>org.springdoc</groupId>
54      <artifactId>springdoc-openapi-starter-webmvc-ui</artifactId>
55      <version>2.6.0</version>
56  </dependency>
57  <dependency>
58      <groupId>com.empresa</groupId>
59      <artifactId>componente-c</artifactId>
60      <version>0.0.1-SNAPSHOT</version>
61  </dependency>
62
63  </dependencies>
64
65  <build>
66      <plugins>
67          <plugin>
68              <groupId>org.springframework.boot</groupId>
69              <artifactId>spring-boot-maven-plugin</artifactId>
70          </plugin>

```

## 5.2. Base de Datos

Conexión: jdbc:mariadb://localhost:3306/componentea\_db

Usuario: root

DDL Auto: update (crea tablas automáticamente)

```

componente-a > src > main > resources > application.properties
 1  spring.application.name=componente-a
 2  spring.datasource.url=jdbc:mariadb://localhost:3306/componentea_db
 3  spring.datasource.username=root
 4  spring.datasource.password=root123
 5  spring.datasource.driver-class-name=org.mariadb.jdbc.Driver
 6
 7  spring.jpa.hibernate.ddl-auto=update
 8  spring.jpa.show-sql=true
 9
10  springdoc.api-docs.path=/api-docs
11  springdoc.swagger-ui.path=/swagger-ui/index.html
12

```

Swagger: <http://localhost:8080/swagger-ui/index.html>

### 5.3. Modelos

Cliente: @Entity con id, nombre, email, teléfono

```
componente-a > src > main > java > com > empresa > a > model > Cliente.java
1  package com.empresa.a.model;
2
3  import jakarta.persistence.*;
4  import com.fasterxml.jackson.annotation.JsonIgnore;
5  import java.util.List;
6
7  @Entity
8  public class Cliente {
9      @Id
10     @GeneratedValue(strategy = GenerationType.IDENTITY)
11     private Long id;
12     private String nombre;
13     private String correo;
14
15     @OneToMany(mappedBy = "cliente", cascade = CascadeType.ALL)
16     @JsonIgnore
17     private List<Pedido> pedidos;
18
19     public Cliente() {}
20
21     // Constructor con parámetros
22     public Cliente(String nombre, String correo) {
23         this.nombre = nombre;
24         this.correo = correo;
25     }
26
27     // Getters y setters
28     public Long getId() {
29         return id;
30     }
31
32     public void setId(Long id) {
33         this.id = id;
34     }
35
36     public String getNombre() {
37         return nombre;
38     }
39
40     public void setNombre(String nombre) {
41         this.nombre = nombre;
42     }
43
44     public String getCorreo() {
45         return correo;
46     }
47
48     public void setCorreo(String correo) {
49         this.correo = correo;
50     }
51
52     public List<Pedido> getPedidos() {
53         return pedidos;
54     }
55 }
```



Pedido: @Entity con id, fecha, total, estado, clienteld

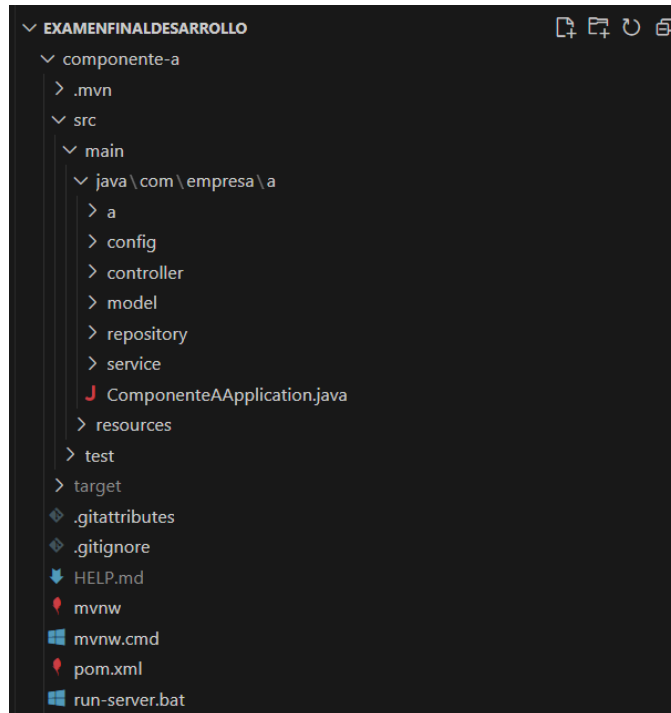
```
componente-a > src > main > java > com > empresa > a > model > J Pedido.java
1 package com.empresa.a.model;
2
3 import jakarta.persistence.*;
4 import java.util.List;
5
6 @Entity
7 public class Pedido {
8     @Id
9     @GeneratedValue(strategy = GenerationType.IDENTITY)
10    private Long id;
11    private String descripcion;
12    private Double total;
13
14    @ManyToOne
15    @JoinColumn(name = "cliente_id")
16    private Cliente cliente;
17
18    @ElementCollection
19    @CollectionTable(name = "pedido_productos", joinColumns = @JoinColumn(name = "pedido_id"))
20    private List<Producto> productos;
21
22    public Pedido() {}
23
24    // Constructor con parámetros (opcional)
25    public Pedido(String descripcion, Double total, Cliente cliente) {
26        this.descripcion = descripcion;
27        this.total = total;
28        this.cliente = cliente;
29    }
30
31    // Getters y setters
32    public Long getId() {
33        return id;
34    }
35
36    public void setId(Long id) {
37        this.id = id;
38    }
39
40    public String getDescripcion() {
41        return descripcion;
42    }
43
44    public void setDescripcion(String descripcion) {
45        this.descripcion = descripcion;
46    }
47
48    public Double getTotal() {
49        return total;
50    }
51
52    public void setTotal(Double total) {
53        this.total = total;
54    }
55
56    public Cliente getCliente() {
57        return cliente;
58    }
59
60    public void setCliente(Cliente cliente) {
61        this.cliente = cliente;
62    }
63
64    public List<Producto> getProductos() {
65        return productos;
66    }
67
68    public void setProductos(List<Producto> productos) {
69        this.productos = productos;
70    }
71 }
72
```

Anotaciones JPA: @Id, @GeneratedValue(IDENTITY)

## 5.4. Arquitectura del Código

Patrón MVC:

- › Controller: Endpoints REST (@RestController, @RequestMapping)
- › Service: Lógica de negocio (@Service, @Autowired)
- › Repository: Persistencia (JpaRepository)
- › Model: Entidades JPA



Endpoints: GET/POST/PUT/DELETE para /api/clientes y /api/pedidos

## 5.5. CORS

Permite peticiones desde localhost:3000 (frontend) hacia localhost:8080

```
componente-a > src > main > java > com > empresa > a > config > CorsConfig.java
8 public class CorsConfig implements WebMvcConfigurer {
9
10     @Override
11     public void addCorsMappings(CorsRegistry registry) {
12         registry.addMapping("/api/**")
13             .allowedOrigins("http://localhost:3000")
14             .allowedMethods("GET", "POST", "PUT", "DELETE", "OPTIONS")
15             .allowedHeaders("Content-Type", "Authorization", "X-Requested-With", "Accept")
16             .allowCredentials(true)
17             .exposedHeaders("Content-Type")
18             .maxAge(3600);
19     }
20 }
```

## 6. COMPONENTE B - PROVEEDORES Y FACTURAS7

### 6.1. Configuración

Similar a Componente A pero con PostgreSQL y Lombok. Puerto 8081.

```
componente-b > pom.xml
1  <?xml version="1.0" encoding="UTF-8"?>
2  <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3  <xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
4  <modelVersion>4.0.0</modelVersion>
5  <parent>
6  <groupId>org.springframework.boot</groupId>
7  <artifactId>spring-boot-starter-parent</artifactId>
8  <version>3.5.7</version>
9  <relativePath/> <!-- lookup parent from repository -->
10 </parent>
11 <groupId>com.empresa.b</groupId>
12 <artifactId>componente-b</artifactId>
13 <version>0.0.1-SNAPSHOT</version>
14 <name>componente-b</name>
15 <description>Demo project for Spring Boot</description>
16 <url/>
17 <licenses>
18 <license/>
19 </licenses>
20 <developers>
21 <developer/>
22 </developers>
23 <scm>
24 <connection/>
25 <developerConnection/>
26 <tag/>
27 <url/>
28 </scm>
29 <properties>
30 <java.version>17</java.version>
31 </properties>
32 <dependencies>
33 <dependency>
34 <groupId>org.springframework.boot</groupId>
35 <artifactId>spring-boot-starter-data-jpa</artifactId>
36 </dependency>
37 <dependency>
38 <groupId>org.springframework.boot</groupId>
39 <artifactId>spring-boot-starter-web</artifactId>
40 </dependency>
41
42 <dependency>
43 <groupId>org.postgresql</groupId>
44 <artifactId>postgresql</artifactId>
45 <scope>runtime</scope>
46 </dependency>
47 <dependency>
48 <groupId>org.springframework.boot</groupId>
49 <artifactId>spring-boot-starter-test</artifactId>
50 <scope>test</scope>
51 </dependency>
52 <dependency>
53 <groupId>org.springdoc</groupId>
54 <artifactId>springdoc-openapi-starter-webmvc-ui</artifactId>
55 <version>2.6.0</version>
56 </dependency>
57 <dependency>
58 <groupId>org.projectlombok</groupId>
59 <artifactId>lombok</artifactId>
60 <version>1.18.32</version>
61 <scope>provided</scope>
62 </dependency>
63 <dependency>
64 <groupId>com.empresa</groupId>
65 <artifactId>componente-c</artifactId>
66 <version>0.0.1-SNAPSHOT</version>
67 </dependency>
68
69 </dependencies>
```

## 6.2. Base de Datos

Conexión: jdbc:postgresql://localhost:5432/componenteb\_db

Usuario: postgres

Puerto: 8081

```
componente-b > src > main > resources > application.properties
1  spring.application.name=componente-b
2  spring.datasource.url=jdbc:postgresql://localhost:5432/componenteb_db
3  spring.datasource.username=postgres
4  spring.datasource.password=postgres123
5  spring.datasource.driver-class-name=org.postgresql.Driver
6  spring.jpa.hibernate.ddl-auto=update
7  spring.jpa.show-sql=true
8  server.port=8081
9  springdoc.api-docs.path=/api-docs
10 springdoc.swagger-ui.path=/swagger-ui/index.html
```

## 6.3. Modelos con Lombok

@Data de Lombok genera getters/setters/toString automáticamente

Proveedor: id, nombre, contacto, teléfono, email

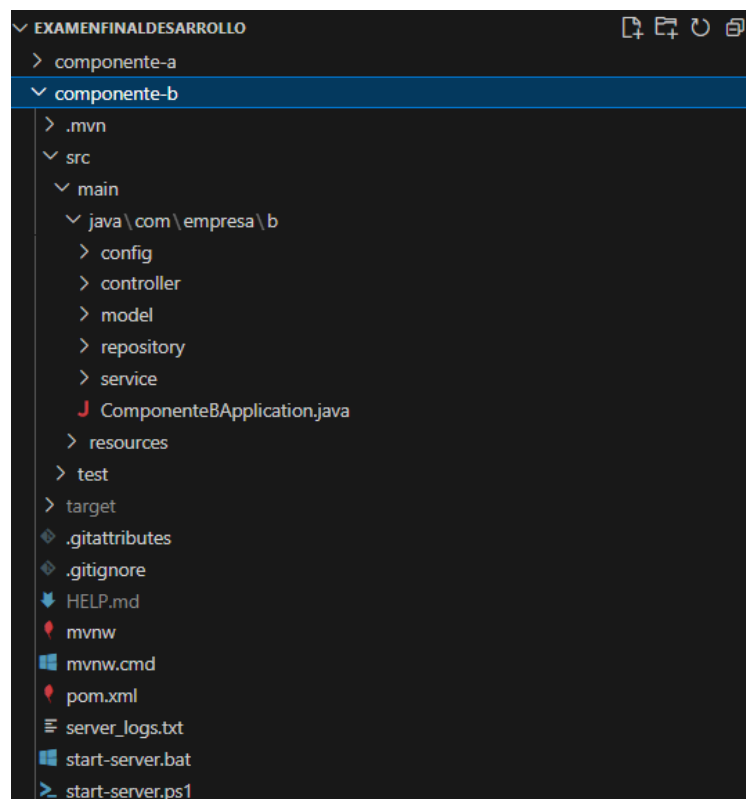
```
componente-b > src > main > java > com > empresa > b > model > Proveedor.java
1  package com.empresa.b.model;
2
3  import jakarta.persistence.*;
4  import lombok.Data;
5
6  @Data
7  @Entity
8  @Table(name = "proveedores")
9  public class Proveedor {
10     @Id
11     @GeneratedValue(strategy = GenerationType.IDENTITY)
12     private Long id;
13
14     @Column(nullable = false)
15     private String nombre;
16
17     @Column(nullable = false)
18     private String correo;
19
20     private String telefono;
21
22     @Column(nullable = false)
23     private String contacto;
24 }
```

Factura: id, numero, fecha, monto, estado, proveedorId

```
componente-b > src > main > java > com > empresa > b > model > Factura.java
1  package com.empresa.b.model;
2
3  import com.fasterxml.jackson.annotation.JsonIgnoreProperties;
4  import jakarta.persistence.*;
5  import lombok.Data;
6
7  @Data
8  @Entity
9  @Table(name = "facturas")
10 public class Factura {
11     @Id
12     @GeneratedValue(strategy = GenerationType.IDENTITY)
13     private Long id;
14
15     private String numero;
16
17     private Double totalFactura;
18
19     @ManyToOne(fetch = FetchType.EAGER)
20     @JoinColumn(name = "proveedor_id")
21     @JsonIgnoreProperties("facturas")
22     private Proveedor proveedor;
23 }
```

#### 6.4. Arquitectura

Misma estructura que A.



## 7. COMPONENTE C - LIBRERÍA COMPARTIDA

### 7.1. POM.XML

Proyecto Maven puro (sin Spring Boot)

GroupId: com.empresa

ArtifactId: componente-c

Sin dependencias externas

Compilación Java 17

```
componente-c > pom.xml
1  <?xml version="1.0" encoding="UTF-8"?>
2  <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3      xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 https://maven.apache.org/xsd/maven-4.0.0.xsd">
4      <modelVersion>4.0.0</modelVersion>
5
6      <groupId>com.empresa</groupId>
7      <artifactId>componente-c</artifactId>
8      <version>0.0.1-SNAPSHOT</version>
9      <name>componente-c</name>
10     <description>Librería Maven compartida con utilidades de negocio</description>
11
12     <properties>
13         <java.version>17</java.version>
14         <maven.compiler.source>17</maven.compiler.source>
15         <maven.compiler.target>17</maven.compiler.target>
16         <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
17     </properties>
18
19     <dependencies>
20         <!-- Sin dependencias de Spring - Maven puro -->
21     </dependencies>
22
23     <build>
24         <plugins>
25             <plugin>
26                 <groupId>org.apache.maven.plugins</groupId>
27                 <artifactId>maven-compiler-plugin</artifactId>
28                 <version>3.11.0</version>
29                 <configuration>
30                     <source>${java.version}</source>
31                     <target>${java.version}</target>
32                 </configuration>
33             </plugin>
34         </plugins>
35     </build>
36
37 </project>
```

## 7.2. Clases Utilitarias

Métodos de validación, formateo y cálculos compartidos entre Componentes A y B.

```
componente-c > src > main > java > com > empresa > c > J Utils.java
1 package com.empresa.c;
2 import java.io.BufferedReader;
3 import java.io.InputStreamReader;
4 import java.net.HttpURLConnection;
5 import java.net.URL;
6 import java.util.List;
7 import java.util.UUID;
8 public class Utils {
9     public static double calcularTotal(List<Double> valores) {
10         if (valores == null || valores.isEmpty()) return 0.0;
11         return valores.stream().mapToDouble(Double::doubleValue).sum();
12     }
13
14     public static String generarCodigoUnico(String tipo) {
15         return tipo.toUpperCase() + "-" + UUID.randomUUID().toString().substring(0, 8).toUpperCase();
16     }
17
18
19
20     public static String invocarEndpointGET(String urlStr) throws Exception {
21         URL url = new URL(urlStr);
22         HttpURLConnection con = (HttpURLConnection) url.openConnection();
23         con.setRequestMethod("GET");
24         con.setConnectTimeout(5000);
25         con.setReadTimeout(5000);
26
27         int status = con.getResponseCode();
28         BufferedReader in = new BufferedReader(new InputStreamReader(
29             status >= 200 && status < 300 ? con.getInputStream() : con.getErrorStream()
30         ));
31         StringBuilder content = new StringBuilder();
32         String line;
33         while ((line = in.readLine()) != null) content.append(line);
34         in.close();
35         con.disconnect();
36         return content.toString();
37     }
38 }
39
```

```
componente-c > src > main > java > com > empresa > c > Util > J MetodosCompartidos.java
1 package com.empresa.c.util;
2
3 import java.util.List;
4 import java.util.UUID;
5
6 public class MetodosCompartidos {
7
8     // Método para generar un código único por tipo de entidad
9     public static String generarCodigoUnico(String tipoEntidad) {
10         return tipoEntidad.toUpperCase() + "-" + UUID.randomUUID().toString().substring(0, 8);
11     }
12
13     // Método para calcular total
14     public static double calcularTotal(List<Double> precios) {
15         return precios.stream().mapToDouble(Double::doubleValue).sum();
16     }
17
18     // Método para calcular total con IVA (12% por defecto)
19     public static double calcularTotalConIVA(double subtotal) {
20         return calcularTotalConIVA(subtotal, 0.12);
21     }
22
23     // Método para calcular total con IVA personalizado
24     public static double calcularTotalConIVA(double subtotal, double tasaIVA) {
25         return subtotal * (1 + tasaIVA);
26     }
27
28     // Método para aplicar descuento porcentual
29     public static double aplicarDescuento(double total, double porcentajeDescuento) {
30         return total * (1 - (porcentajeDescuento / 100.0));
31     }
32
33     // Método para calcular total con IVA y descuento
34     public static double calcularTotalConIVAYDescuento(double subtotal, double porcentajeDescuento) {
35         return calcularTotalConIVAYDescuento(subtotal, porcentajeDescuento, 0.12);
36     }
37
38     // Método para calcular total con IVA personalizado y descuento
39     public static double calcularTotalConIVAYDescuento(double subtotal, double porcentajeDescuento, double tasaIVA) {
40         double conDescuento = aplicarDescuento(subtotal, porcentajeDescuento);
41         return calcularTotalConIVA(conDescuento, tasaIVA);
42     }
43
44     // Ejemplo de integración circular: invoca endpoint de A o B
45     public static void notificarRegistro(String urlEndpoint) {
46         try {
47             var connection = new java.net.URL(urlEndpoint).openConnection();
48             connection.getInputStream().close();
49             System.out.println("Notificación enviada correctamente a: " + urlEndpoint);
50         } catch (Exception e) {
51             System.err.println("Error al notificar: " + e.getMessage());
52         }
53     }
54 }
```

### 7.3. Maven Install

Instala el JAR en ~/.m2/repository/

componentes A y B

```

C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo> .\mvnw.cmd clean install
[INFO] Scanning for projects...
[INFO]
[INFO] < com.empresa.b:componente-b >
[INFO] Building componente-b 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO]
[INFO] [ jar ]
[INFO]
[INFO] --- clean:3.4.1:clean (default-clean) @ componente-b ---
[INFO] Deleting C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ componente-b ---
[INFO] Copying 1 resource from src/main/resources to target/classes
[INFO] Copying 1 resource from src/main/resources to target/classes
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ componente-b ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 1 source files with javac [debug parameters release 17] to target/classes
[INFO] C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\src\main\java\com\empresa/b/controller\FacturaController.java: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\src\main\java\com\empresa\b\controller\FacturaController.java uses unchecked or unsafe operations.
[INFO] C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\src\main\java\com\empresa/b/controller\FacturaController.java: Recompile with -Xlint:unchecked for details.
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ componente-b ---
[INFO] skip non existing resourceDirectory C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\src\test\resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ componente-b ---
[INFO] Recompiling the module because of changed dependency.
[INFO]
[INFO] --- surefire:3.5.4:test (default-test) @ componente-b ---
[INFO]
[INFO] --- jar:3.4.2:jar (default-jar) @ componente-b ---
[INFO] Building jar: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target\componente-b-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- spring-boot:3.0.7:repackage (repackage) @ componente-b ---
[INFO] Replacing main artifact C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target\componente-b-0.0.1-SNAPSHOT.jar with repackaged archive, adding nested dependencies in BOOT-INF/.
[INFO] The original artifact has been renamed to C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target\componente-b-0.0.1-SNAPSHOT.jar.original
[INFO]
[INFO] --- install:3.1.4:install (default-install) @ componente-b ---
[INFO] Installing C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\pom.xml to C:\Users\Rocio López\.m2\repository\com\empresa\b\componente-b\0.0.1-SNAPSHOT\componente-b-0.0.1-SNAPSHOT.pom
[INFO] Installing C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target\componente-b-0.0.1-SNAPSHOT.jar to C:\Users\Rocio López\.m2\repository\com\empresa\b\componente-b\0.0.1-SNAPSHOT\componente-b-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 14.837 s
[INFO] Finished at: 2025-11-15T11:11:49-06:00
[INFO]

```

```

PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a> .\nw.cmd clean install
[INFO] Scanning for projects...
[INFO]
[INFO] < com.empresa.a:componente-a >
[INFO] Building componente-a 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO]
[INFO] --- clean:3.4.1:clean (default-clean) @ componente-a ---
[INFO] Deleting C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ componente-a ---
[INFO] Copying 1 resource from src/main/resources to target/classes
[INFO] Copying 1 resource from src/main/resources to target/classes
[INFO]
[INFO] --- compiler:3.10.1:compile (default-compile) @ componente-a ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 14 source files with javac [debug parameters release 17] to target/classes
[INFO] C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\src/main/java/com/empresa/a/controller/PedidoController.java: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\src\mai
n\java\com\empresa/a/controller/PedidoController.java uses unchecked or unsafe operations.
[INFO] C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\src/main/java\com\empresa/a/controller/PedidoController.java: Recompile with -Xlint:unchecked for details.
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ componente-a ---
[INFO] skip non existing resourceDirectory C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\src\test\resources
[INFO]
[INFO] --- compiler:3.10.1:testCompile (default-testCompile) @ componente-a ---
[INFO] Recompiling the module because of changed dependency.
[INFO] Compiling 1 source file with javac [debug parameters release 17] to target/test-classes
[INFO]
[INFO] --- surefire:3.0.4:test (default-test) @ componente-a ---
[INFO] Using auto detected provider org.apache.maven.surefire.junitplatform.JUnit4PlatformProvider
[INFO]
[INFO]
[INFO] T E S T S
[INFO]
[INFO]
[INFO] Running com.empresa.a.componente.a.ComponentAApplicationTests
11:32:25.515 [main] INFO org.springframework.test.context.support.AnnotationConfigContextLoaderUtils -- Could not detect default configuration classes for test class [com.empresa.a.componente.a.ComponentA
ApplicationTests]: ComponentAApplicationTests does not declare any static, non-private, non-final, nested classes annotated with @Configuration.
11:32:25.596 [main] INFO org.springframework.boot.test.context.SpringBootTestContextBootstrapper -- Found @SpringBootConfiguration com.empresa.a.ComponentAApplication for test class com.empresa.a.componente.a.ComponentAApplicationTests

```



## 8. DASHBOARD FRONTEND

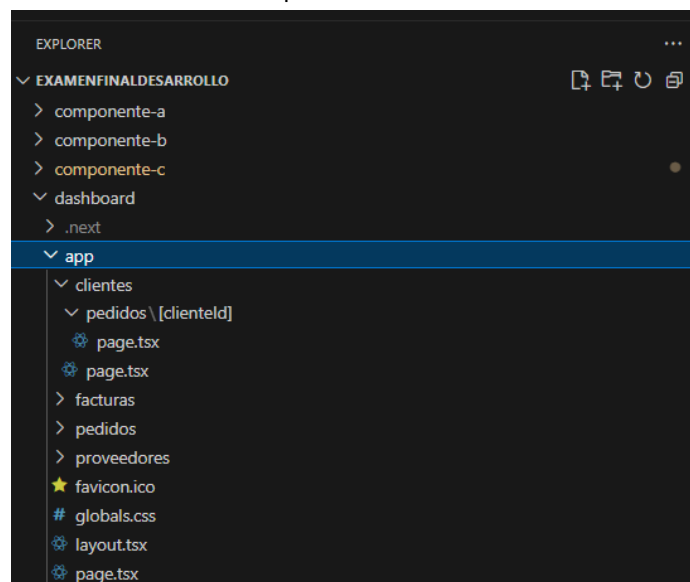
### 8.1. Configuración

Next.js 16.0.2, React 19, TypeScript, Tailwind CSS

```
dashboard > {} package.json > ...
1  {
2    "name": "dashboard",
3    "version": "0.1.0",
4    "private": true,
5    "scripts": {
6      "dev": "next dev",
7      "build": "next build",
8      "start": "next start",
9      "lint": "eslint"
10   },
11   "dependencies": {
12     "react": "19.2.0",
13     "react-dom": "19.2.0",
14     "next": "16.0.2"
15   },
16   "devDependencies": {
17     "typescript": "^5",
18     "@types/node": "^20",
19     "@types/react": "^19",
20     "@types/react-dom": "^19",
21     "@tailwindcss/postcss": "^4",
22     "tailwindcss": "^4",
23     "eslint": "^9",
24     "eslint-config-next": "16.0.2"
25   }
26 }
```

### 8.2. Estructura de Rutas

- › App Router de Next.js: /clientes, /pedidos, /proveedores, /facturas
- › Rutas dinámicas: /pedidos/info/[id]



### 8.3. Servicios API

Funciones fetch para consumir APIs:

fetchClientes() → localhost:8080/api/clientes

fetchProveedores() → localhost:8081/api/proveedores

CRUD completo (GET, POST, PUT, DELETE)

```
dashboard > lib > TS apits > ...
1 // API Configuration
2 const API_BASE_A = process.env.NEXT_PUBLIC_API_A || "http://localhost:8080/api";
3 const API_BASE_B = process.env.NEXT_PUBLIC_API_B || "http://localhost:8081/api";
4
5 export { API_BASE_A, API_BASE_B };
6
7 // Helper function to make API calls with better error handling
8 export async function fetchAPI(url: string, options?: RequestInit) {
9   try {
10     console.log(`[API] Llamando a: ${url} con método: ${options?.method || "GET"}`);
11
12     const headers: HeadersInit = {
13       "Content-Type": "application/json",
14       ...options?.headers,
15     };
16
17     const response = await fetch(url, {
18       ...options,
19       headers,
20     });
21
22     console.log(`[API] Response status: ${response.status}`);
23
24     if (!response.ok) {
25       const errorText = await response.text();
26       console.error(`[API] Error response body:`, errorText);
27       throw new Error(`API Error ${response.status}: ${errorText}`);
28     }
29
30     const responseText = await response.text();
31     console.log(`[API] Response text:`, responseText);
32
33     // Parse JSON de manera segura
34     if (!responseText) {
35       return null;
36     }
37
38     try {
39       const data = JSON.parse(responseText);
40       console.log(`[API] Response data:`, data);
41       return data;
42     } catch (jsonError) {
43       console.error("[API] Error parsing JSON:", jsonError);
44       // Si falla el parsing, devolvemos el texto como está
45       return responseText;
46     }
47   } catch (error) {
48     console.error("[API] Fetch error:", error);
49     throw error;
50   }
51 }
```

## 9. COMPILACIÓN Y EJECUCIÓN

### 9.1. Componente A

```
Windows PowerShell
PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a> .\mvnw.cmd clean compile
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.empresa.a:componente-a >-----
[INFO] Building componente-a 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- clean:3.4.1:clean (default-clean) @ componente-a ---
[INFO] Deleting C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ componente-a ---
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO]
[INFO] --- compiler:3.14.1:compile (default-compile) @ componente-a ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 14 source files with javac [debug parameters release 17] to target\classes
[INFO] /C:/Users/Rocio López/Desktop/ExamenFinalDesarrollo/componente-a/src/main/java/com/empresa/a/controller/PedidoCon
troller.java: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\src\main\java\com\empresa\a\controller\Ped
idoController.java uses unchecked or unsafe operations.
[INFO] /C:/Users/Rocio López/Desktop/ExamenFinalDesarrollo/componente-a/src/main/java/com/empresa/a/controller/PedidoCon
troller.java: Recompile with -Xlint:unchecked for details.
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 6.561 s
[INFO] Finished at: 2025-11-15T11:23:22-06:00
[INFO]
PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a>
```

### 9.2. Componente B

```
Windows PowerShell
PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b> .\mvnw.cmd clean compile
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.empresa.b:componente-b >-----
[INFO] Building componente-b 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- clean:3.4.1:clean (default-clean) @ componente-b ---
[INFO] Deleting C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ componente-b ---
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO]
[INFO] --- compiler:3.14.1:compile (default-compile) @ componente-b ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 11 source files with javac [debug parameters release 17] to target\classes
[INFO] /C:/Users/Rocio López/Desktop/ExamenFinalDesarrollo/componente-b/src/main/java/com/empresa/b/controller/FacturaCo
ntroller.java: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b\src\main\java\com\empresa\b\controller\Fa
cturaController.java uses unchecked or unsafe operations.
[INFO] /C:/Users/Rocio López/Desktop/ExamenFinalDesarrollo/componente-b/src/main/java/com/empresa/b/controller/FacturaCo
ntroller.java: Recompile with -Xlint:unchecked for details.
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 6.948 s
[INFO] Finished at: 2025-11-15T11:23:30-06:00
[INFO]
PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-b>
```

## 9.3. Componente C

```
Windows PowerShell
Instale la versión más reciente de PowerShell para obtener nuevas características y mejoras. https://aka.ms/PSWindows

PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c> .\mvnw.cmd clean install
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.empresa:componente-c >-----
[INFO] Building componente-c 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO]
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ componente-c ---
[INFO] Deleting C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ componente-c ---
[INFO] Copying 1 resource from src/main/resources to target/classes
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ componente-c ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 2 source files with javac [debug target 17] to target/classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ componente-c ---
[INFO] skip non existing resourceDirectory C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ componente-c ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ componente-c ---
[INFO] No tests to run.
[INFO]
[INFO] --- jar:3.4.1:jar (default-jar) @ componente-c ---
[INFO] Building jar: C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c\target\componente-c-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- install:3.1.2:install (default-install) @ componente-c ---
[INFO] Installing C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c\pom.xml to C:\Users\Rocio López\.m2\repository\com\empresa\componente-c\0.0.1-SNAPSHOT\componente-c-0.0.1-SNAPSHOT.pom
[INFO] Installing C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c\target\componente-c-0.0.1-SNAPSHOT.jar to C:\Users\Rocio López\.m2\repository\com\empresa\componente-c\0.0.1-SNAPSHOT\componente-c-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 10.151 s
[INFO] Finished at: 2025-11-15T11:20:30-06:00
[INFO]
PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-c>
```

## 9.4. Backend

Componente A - .\mvnw.cmd spring-boot:run

```
Windows PowerShell
[INFO] --- spring-boot:3.5.7:run (default-cli) @ componente-a ---
[INFO] Attaching agents: []

:: Spring Boot :: (v3.5.7)

2025-11-15T11:25:26.327-06:00 INFO 48736 --- [componente-a] [main] com.empresa.a.ComponenteAApplication : Starting ComponenteAApplication using Java 17.0.16 with PID 48736 (C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a\target\classes started by Rocio López in C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\componente-a)
2025-11-15T11:25:26.334-06:00 INFO 48736 --- [componente-a] [main] com.empresa.a.ComponenteAApplication : No active profile set, falling back to 1 default profile: "default"
2025-11-15T11:25:27.626-06:00 INFO 48736 --- [componente-a] [main] s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in DEFAULT mode.
2025-11-15T11:25:27.727-06:00 INFO 48736 --- [componente-a] [main] s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 86 ms. Found 2 JPA repository interface
s.
2025-11-15T11:25:28.686-06:00 INFO 48736 --- [componente-a] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8080 (http)
2025-11-15T11:25:28.731-06:00 INFO 48736 --- [componente-a] [main] o.apache.catalina.core.StandardService : Starting service [tomcat]
2025-11-15T11:25:28.731-06:00 INFO 48736 --- [componente-a] [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.40]
2025-11-15T11:25:28.854-06:00 INFO 48736 --- [componente-a] [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-11-15T11:25:28.856-06:00 INFO 48736 --- [componente-a] [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 2427 ms
2025-11-15T11:25:29.188-06:00 INFO 48736 --- [componente-a] [main] o.hibernate.jpa.internal.util.LogHelper : HHH00000000: Processing PersistenceUnitInfo [name: default]
2025-11-15T11:25:29.187-06:00 INFO 48736 --- [componente-a] [main] org.hibernate.Version : HHH0000412: Hibernate ORM core version 6.6.23.Final
2025-11-15T11:25:29.250-06:00 INFO 48736 --- [componente-a] [main] o.h.c.internal.RegionFactoryInitiator : HHH0000026: Second-level cache disabled
2025-11-15T11:25:29.702-06:00 INFO 48736 --- [componente-a] [main] o.s.o.j.p.SpringPersistenceUnitInfo : No LoadTimeWeaver setup: ignoring JPA class transformer
2025-11-15T11:25:29.740-06:00 INFO 48736 --- [componente-a] [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2025-11-15T11:25:29.918-06:00 INFO 48736 --- [componente-a] [main] com.zaxxer.hikari.pool.HikariPool : HikariPool-1 - Added connection org.mariadb.jdbc.Connection@5f45bc8e
2025-11-15T11:25:29.918-06:00 INFO 48736 --- [componente-a] [main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2025-11-15T11:25:30.029-06:00 INFO 48736 --- [componente-a] [main] org.hibernate.orm.connections.pooling : HHH10001005: Database info:
Database driver: undefined/unknown
Database version: 10.11.14
Autocommit mode: undefined/unknown
Isolation level: undefined/unknown
Minimum pool size: undefined/unknown
Maximum pool size: undefined/unknown
2025-11-15T11:25:31.480-06:00 INFO 48736 --- [componente-a] [main] o.h.e.t.j.p.i.JtaPlatformInitiator : HHH0000489: No JTA platform available (set 'hibernate.transaction.jta.platform' to e
nable JTA platform integration)
2025-11-15T11:25:31.600-06:00 INFO 48736 --- [componente-a] [main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'
2025-11-15T11:25:32.036-06:00 WARN 48736 --- [componente-a] [main] jpaBaseConfigurationJpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be p
erformed during view rendering. Explicitly configure spring.jpa.open-in-view to disable this warning
2025-11-15T11:25:32.113-06:00 INFO 48736 --- [componente-a] [main] o.s.v.b.OptionalValidatorFactoryBean : Failed to set up a Bean Validation provider: jakarta.validation.NoProviderFoundExce
ption: Unable to create a Configuration, because no Jakarta Bean Validation provider could be found. Add a provider like Hibernate Validator (RI) to your classpath.
2025-11-15T11:25:32.697-06:00 INFO 48736 --- [componente-a] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8080 (http) with context path '/'
2025-11-15T11:25:32.716-06:00 INFO 48736 --- [componente-a] [main] com.empresa.a.ComponenteAApplication : Started ComponenteAApplication in 7.114 seconds (process running for 7.706)
```

Componente B - `.\mvnw.cmd spring-boot:run`

```

Windows PowerShell
[INFO] << spring-boot-3.0.7.run (default-cli) < test-compile @ componente-b <<
[INFO]
[INFO]
[INFO] spring-boot-3.0.7.run (default-cli) @ componente-b ---
[INFO] Attaching agents: []

<img alt="Spring logo" data-bbox="10 200 200 300"/>

:: Spring Boot ::
               (v3.0.7)

2025-11-15T11:27:06.853-06:00 INFO 55656 -- [componente-b] [
0pe2/Desktop/ExamenFinalDesarrollo/componente-b/target/classes started by Rocio López in C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo(componente-b)
2025-11-15T11:27:06.868-06:00 INFO 55656 -- [componente-b] [
main] com.empresa.b.ComponenteBApplication : No active profile set, falling back to 1 default profile: "default"
2025-11-15T11:27:08.000-06:00 INFO 55656 -- [componente-b] [
main] s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in DEFAULT mode.
2025-11-15T11:27:08.223-06:00 INFO 55656 -- [componente-b] [
main] s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 80 ms. Found 2 JPA repository interface
s.
2025-11-15T11:27:09.167-06:00 INFO 55656 -- [componente-b] [
main] o.h.e.m.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8081 (http)
2025-11-15T11:27:09.179-06:00 INFO 55656 -- [componente-b] [
main] o.apache.catalina.core.StandardServer : Starting service [Tomcat]
2025-11-15T11:27:09.179-06:00 INFO 55656 -- [componente-b] [
main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.48]
2025-11-15T11:27:09.321-06:00 INFO 55656 -- [componente-b] [
main] o.a.e.c.c.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-11-15T11:27:09.321-06:00 INFO 55656 -- [componente-b] [
main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 2973 ms
2025-11-15T11:27:09.580-06:00 INFO 55656 -- [componente-b] [
main] o.hibernate.jta.internal.util.LogHelper : HHH000204: Processing PersistenceUnitInfo [name: default]
2025-11-15T11:27:09.660-06:00 INFO 55656 -- [componente-b] [
main] org.hibernate.Version : HHH000412: Hibernate ORM core version 6.6.33.Final
2025-11-15T11:27:09.723-06:00 INFO 55656 -- [componente-b] [
main] o.h.c.internal.RegionFactoryInitiator : No LoadTimeWeaver setup; ignoring org.class transformer
2025-11-15T11:27:10.166-06:00 INFO 55656 -- [componente-b] [
main] o.s.o.j.p.SpringPersistenceUnitInfo : No LoadTimeWeaver setup; ignoring org.class transformer
2025-11-15T11:27:10.218-06:00 INFO 55656 -- [componente-b] [
main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Starting...
2025-11-15T11:27:10.504-06:00 INFO 55656 -- [componente-b] [
main] com.zaxxer.hikari.pool.HikariPool : HikariPool-1 - Added connection org.postgresql.jdbc.PgConnection@74c97fdd
2025-11-15T11:27:10.504-06:00 INFO 55656 -- [componente-b] [
main] com.zaxxer.hikari.HikariDataSource : HikariPool-1 - Start completed.
2025-11-15T11:27:10.697-06:00 INFO 55656 -- [componente-b] [
main] org.hibernate.orm.connections.pooling : HHH10001905: Database info:
Database JDBC URL [Connecting through datasource 'HikariDataSource (HikariPool-1)']
Database driver: undefined/unknown
Database version: 19.0
Autocommit mode: undefined/unknown
Isolation level: undefined/unknown
Minimum pool size: undefined/unknown
Maximum pool size: undefined/unknown
2025-11-15T11:27:12.044-06:00 INFO 55656 -- [componente-b] [
main] o.h.e.t.j.p.i.JtaPlatformInitiator : HHH000489: No JTA platform available (set 'hibernate.transaction.jta.platform' to o
nable JTA platform integration)
2025-11-15T11:27:12.263-06:00 INFO 55656 -- [componente-b] [
main] j.localContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'
2025-11-15T11:27:12.648-06:00 WARN 55656 -- [componente-b] [
main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be p
erformed during view rendering. Explicitly configure spring.jpa.open-in-view to disable this warning
2025-11-15T11:27:13.298-06:00 INFO 55656 -- [componente-b] [
main] org.springframework.boot.autoconfigure.orm.jpa.HibernateValidationSupport : Failed to set up a Bean Validation provider: jakarta.validation.NoProviderFoundExce
ption: Unable to create a Configuration, because no jakarta Bean Validation provider could be found. Add a provider like
2025-11-15T11:27:13.298-06:00 INFO 55656 -- [componente-b] [
main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8081 (http) with context path '/'

```

## 9.5. Frontend

```

next-server (v16.0.2)
Windows PowerShell
Copyright (C) Microsoft Corporation. Todos los derechos reservados.

Instale la versión más reciente de PowerShell para obtener nuevas características y mejoras. https://aka.ms/PSWindows

PS C:\Users\Rocio López\Desktop\ExamenFinalDesarrollo\dashboard> npm run dev

> dashboard@0.1.0 dev
> next dev

  ▲ Next.js 16.0.2 (Turbopack)
  - Local:      http://localhost:3000
  - Network:    http://192.168.56.1:3000
  - Environments: .env.local

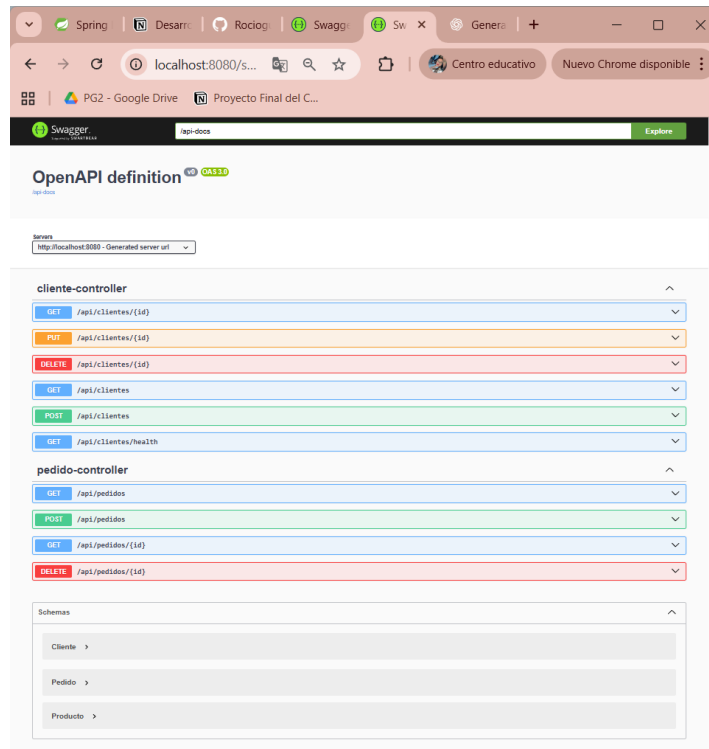
✓ Starting...
✓ Ready in 1894ms
o Compiling / ...
GET / 200 in 5.2s (compile: 4.8s, render: 435ms)

```

## 10. Demostración

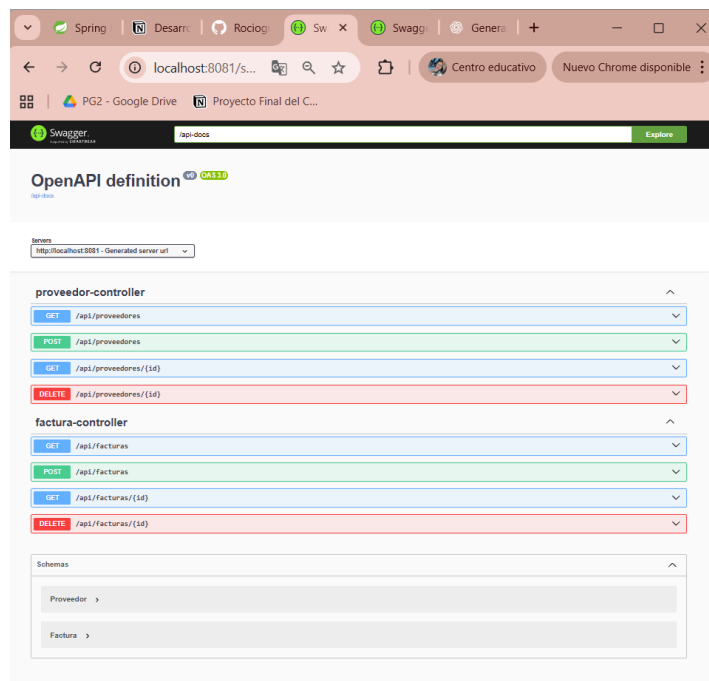
### 10.1. SWAGGER A

Endpoints de Cliente y Pedido



### 10.2. Swagger B

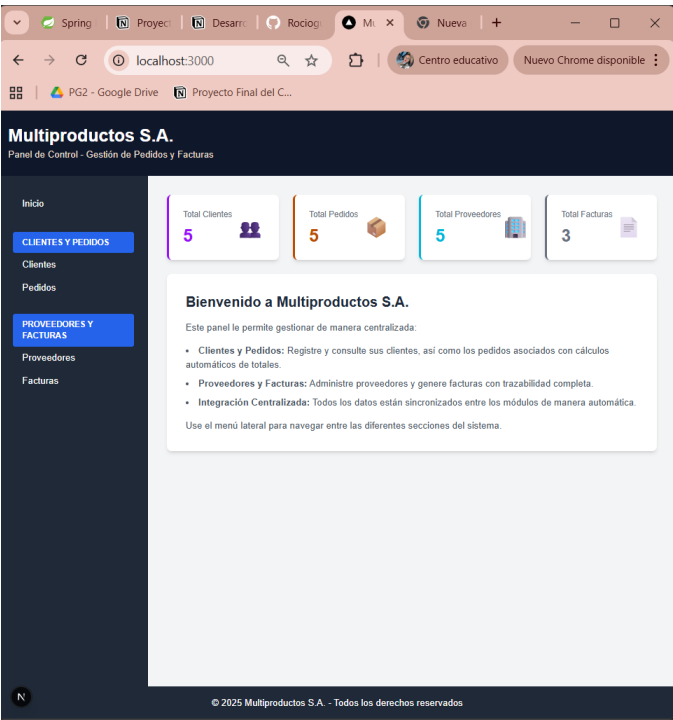
Endpoints de proveedores y facturas.



# 11. DASHBOARD

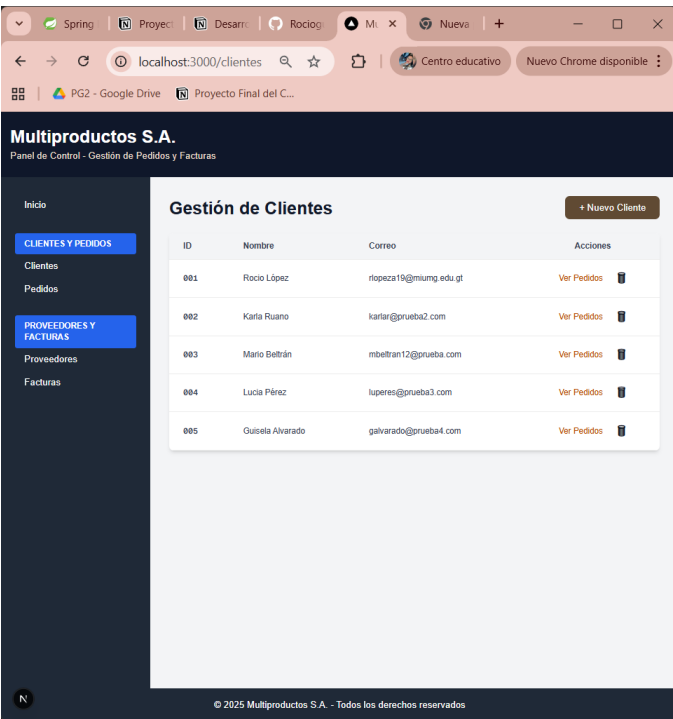
## 11.1. Home

Página principal con navegación a todas las secciones.



## 11.2. Gestión de Clientes

Tabla con clientes obtenidos del API (puerto 8080).



# Gestión de Clientes

+ Nuevo Cliente

## Crear Nuevo Cliente

Nombre

Ej. Juan Pérez

Correo Electrónico

Ej. juan@example.com

Guardar

Cancelar

Spring Initializ

Desarrollo Web - Vi

Rociogu/ExamenFin

Historial de exámen

Multiproductos S.A.

Desarrollo Web - Go

Arquitectura Hexag:

localhost:3000/clientes/pedidos/1

Centro educativo

Nuevo Chrome disponible

Multiproductos S.A.

Panel de Control - Gestión de Pedidos y Facturas

Inicio

CLIENTES Y PEDIDOS

Proveedores y Facturas

Clientes

Pedidos

Proveedores

Facturas

Volver a Clientes

Rocio López

rlopeza19@miunmg.edu.gt

Total de Pedidos

1

Monto Total

Q.8599.00

Cliente ID

#001

Pedidos Registrados

ID PEDIDO

#17

CÓDIGO

PEDIDO-F11ECD71

CANTIDAD ARTÍCULOS

1

TOTAL

Q.8599.00

Artículos

Producto	P. Unitario	Cantidad	Subtotal
VICTOR	Q.8599.00	1	Q.8599.00

+ Crear Nuevo Pedido para este Cliente

N

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## 11.3. Gestión de Pedidos

**Multiproductos S.A.**  
Panel de Control - Gestión de Pedidos y Facturas

**Gestión de Pedidos** [+ Nuevo Pedido](#)

ID	Descripción	Cliente ID	Total	Acciones
P001	PEDIDO-3833267E	003	Q.3,599.00	<a href="#">Detalle</a>
P002	PEDIDO-066AA019	002	Q.8,599.00	<a href="#">Detalle</a>
P003	PEDIDO-F11ECD71	001	Q.8,599.00	<a href="#">Detalle</a>
P004	PEDIDO-8D4F543A	004	Q.7,198.00	<a href="#">Detalle</a>
P005	PEDIDO-E06F366C	005	Q.8,599.00	<a href="#">Detalle</a>

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### Gestión de Pedidos

[+ Nuevo Pedido](#)

#### Crear Nuevo Pedido

Cliente

Seleccionar cliente...

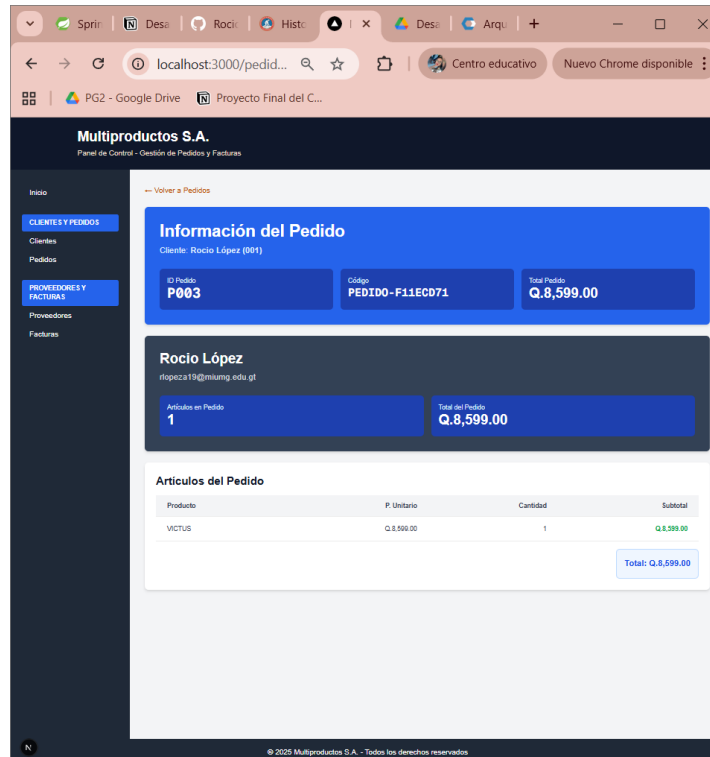
Productos

Marca	Precio Unidad	Cantidad	Subtotal
Seleccionar producto...	Q.0.00	1	Q.0.00

[+ Agregar Producto](#)

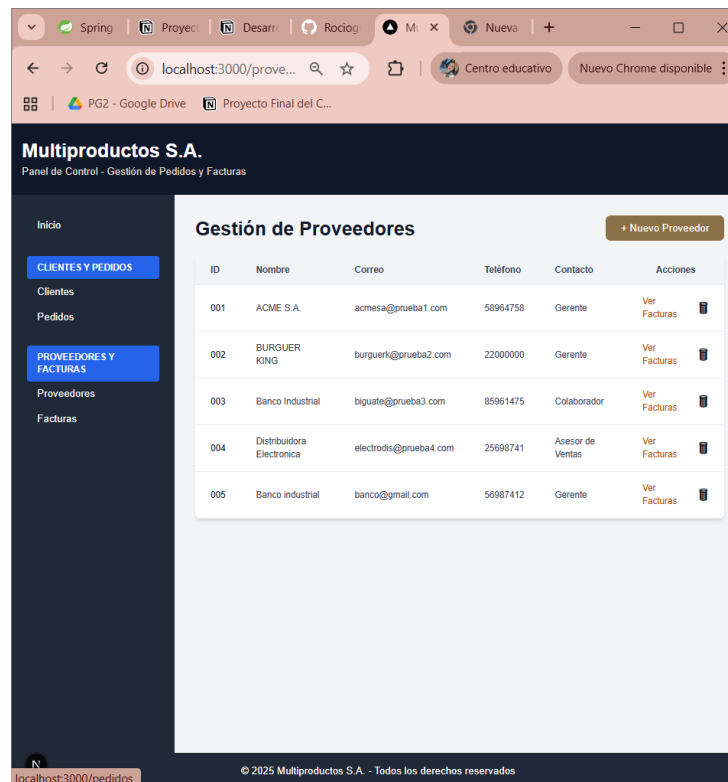
Total Estimado: Q.0.00

[Guardar Pedido](#) [Cancelar](#)



## 11.4. Gestión de Proveedores

Lista de proveedores del API (puerto 8081).



## Gestión de Proveedores

+ Nuevo Proveedor

### Crear Nuevo Proveedor

Nombre

Ej. ACME S.A.

Correo Electrónico

Ej. ventas@acme.com

Teléfono

Ej. +56912345678

Contacto

Ej. Gerente de Ventas

Guardar

Cancelar

## 11.5. Gestión de Facturas

Spring | Proyecto | Desarrollo | Rociog | Mi x | Nueva | +

localhost:3000/factur... | Centro educativo | Nuevo Chrome disponible

PG2 - Google Drive | Proyecto Final del C...

Multiproductos S.A.

Panel de Control - Gestión de Pedidos y Facturas

Inicio

CLIENTES Y PEDIDOS

Cientes

Pedidos




PROVEEDORES Y FACTURAS

Proveedores

Facturas

Gestión de Facturas

+ Nueva Factura

ID	Número	Proveedor	Total	Acciones
001	FACT-6F84015F	ACME S.A.	Q.72.00	<a href="#">Ver Detalle</a> 
005	FAC-7B198ABD	BURGUER KING	Q.3,599.00	<a href="#">Ver Detalle</a> 
006	FAC-6876FAA0	Banco Industrial	Q.0.00	<a href="#">Ver Detalle</a> 

N

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## Gestión de Facturas

+ Nueva Factura

### Crear Nueva Factura

Proveedor

Seleccionar proveedor...

Productos

Seleccionar producto...

Q.0.00

1

Q.0.00

+ Agregar Item

Marca | Precio Unitario | Cantidad | Subtotal

NIT

Ej. 1234567890

C/F

Seleccionar...

Total Factura: Q.0.00

Guardar Factura

Cancelar

localhost:3000/factur...

Centro educativo

Nuevo Chrome disponible

PG2 - Google Drive

Proyecto Final del C...

Multiproductos S.A.

Panel de Control - Gestión de Pedidos y Facturas

Inicio

CLIENTES Y PEDIDOS

Cientes

Pedidos

PROVEEDORES Y FACTURAS

Proveedores

Facturas

FACTURA

Nº FACTURA

FACT-6F84015F

PROVEEDOR ID

015

PROVEEDOR

NOMBRE

ACME S.A.

CORREO

acmesa@prueba1.com

TELÉFONO

58964758

CONTACTO

Gerente

SUBTOTAL

Q.64.29

IVA (12%)

Q.7.71

TOTAL FACTURA

Q.72.00

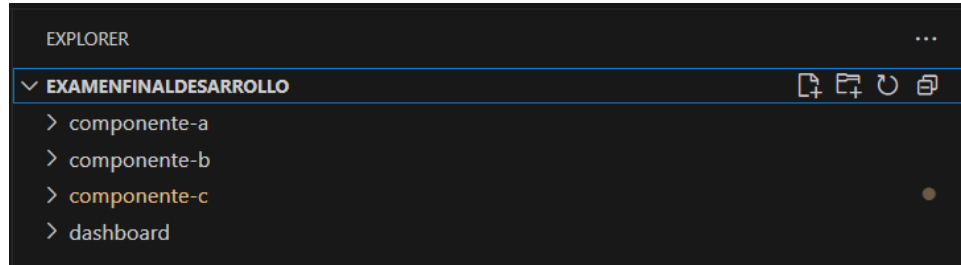
Volver a Facturas

Imprimir

## 12. ESTRUCTURA DEL PROYECTO

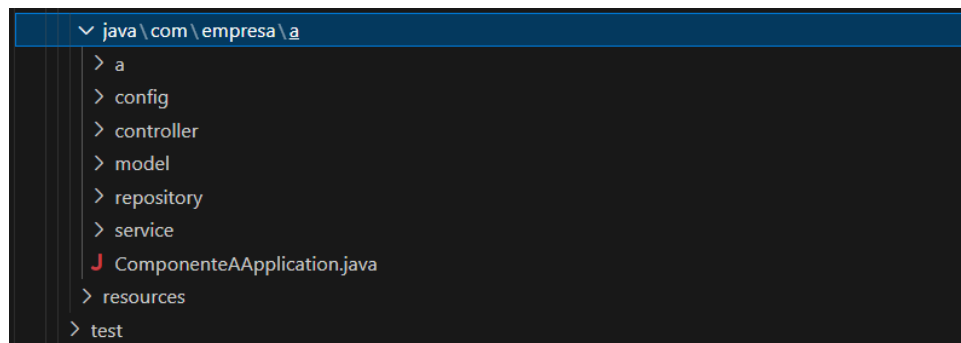
### 12.1. Vista General

Arquitectura de microservicios con 3 componentes backend y 1 frontend.



### 12.2. Estructura Interna

Patrón MVC estándar de Spring Boot. Separación de responsabilidades.



## CONCLUSIÓN

Las conclusiones del proyecto reflejan el cumplimiento de los objetivos planteados y la correcta implementación de una arquitectura moderna, escalable y orientada a buenas prácticas de desarrollo. A lo largo del proceso se logró diseñar, construir e integrar múltiples componentes que trabajan de manera independiente y coordinada, garantizando robustez, mantenibilidad y eficiencia en el flujo general del sistema. Entre los principales logros alcanzados se destacan:

- Arquitectura de microservicios con servicios independientes
- Cada componente con su propia base de datos (MariaDB y PostgreSQL)
- Librería compartida (componente-c) para código reutilizable
- APIs REST documentadas con Swagger
- Frontend moderno con Next.js y TypeScript
- Configuración CORS para integración frontend-backend
- Persistencia con JPA/Hibernate
- Gestión de dependencias con Maven

## APRENDIZAJE

- Diseño e implementación de microservicios
- Spring Boot y Spring Data JPA
- Next.js App Router y React hooks
- Integración de múltiples tecnologías
- Resolución de problemas de configuración

## ANEXOS

### Comandos Principales

```
PS C:\Users\Rocío López\Desktop\ExamenFinalDesarrollo\dashboard> npm run dev
```

```
PS C:\Users\Rocío López\Desktop\ExamenFinalDesarrollo\componente-a> .\mvnw.cmd spring-boot:run
```

```
PS C:\Users\Rocío López\Desktop\ExamenFinalDesarrollo\componente-b> .\mvnw.cmd spring-boot:run
```

```
PS C:\Users\Rocío López\Desktop\ExamenFinalDesarrollo\componente-c> .\mvnw.cmd clean install
```

### URLs del Sistema

Componente A API:	<a href="http://localhost:8080/api/">http://localhost:8080/api/</a>
Componente A Swagger:	<a href="http://localhost:8080/swagger-ui/index.html">http://localhost:8080/swagger-ui/index.html</a>
Componente B API:	<a href="http://localhost:8081/api/">http://localhost:8081/api/</a>
Componente B Swagger	<a href="http://localhost:8081/swagger-ui/index.html"><u>http://localhost:8081/swagger- ui/index.html</u></a>
Dashboard	<a href="http://localhost:3000">http://localhost:3000</a>