

Parcial 1 - Base de Datos II

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Proyecto E-commerce

Fase 1: Planificación y Diseño del Esquema de Datos

1.1 - Descripción del Proyecto

Este proyecto consiste en el desarrollo del backend para una plataforma de E-commerce. El sistema está diseñado para gestionar las funcionalidades clave de una tienda en línea, resolviendo la necesidad de una estructura de datos robusta y escalable que pueda manejar:

- Productos con múltiples variantes (como color o talla)
- Carritos de compra
- Perfiles de usuario
- Historial de pedidos
- Funcionalidades principales:
- Gestión de productos y su inventario por variante
- Registro y autenticación de usuarios
- Gestión de direcciones de envío y facturación
- Creación y seguimiento de pedidos
- El objetivo es construir una base sólida, eficiente para consultas comunes como:
- Búsqueda de productos
- Verificación de stock
- Generación de reportes de ventas

1.2 - Modelado de Datos



Entidades Principales

Usuarios (users): Información de autenticación

Perfiles de Usuario (user_profiles): Datos personales y direcciones

Productos (products): Información base y descriptiva

Variantes de Producto (product_variants): Versiones específicas por atributos

Pedidos (orders): Registro de transacciones



Colecciones y Esquemas



users (Solo Auth)

```
{
  "_id": ObjectId,
  "email": "string",
  "passwordHash": "string",
  "role": "customer" | "admin"
}
```

user_profiles

```
{
  "_id": ObjectId,
  "userId": ObjectId,
  "name": "string",
  "phone": "string",
  "addresses": [
    {
      "type": "billing" | "shipping",
      "street": "string",
      "city": "string",
      "zip": "string",
      "country": "string"
    }
  ]
}
```

products

```
{
  "_id": ObjectId,
  "name": "string",
  "description": "string",
  "categoryId": ObjectId,
  "availableOn": "Date",
  "deletedAt": "Date"
}
```

productVariants

```
{
  "_id": ObjectId,
  "productId": ObjectId,
  "sku": "string",
  "price": "number",
  "stock": "number",
  "attributes": {
    "color": "string",
    "size": "string"
  },
  "isMaster": "boolean"
}
```

orders

```
{
  "_id": ObjectId,
  "userId": ObjectId,
  "items": [
    {
      "variantId": ObjectId,
      "productId": ObjectId,
      "quantity": "number",
      "unitPrice": "number"
    }
  ],
  "shippingAddress": { ... },
  "status": "pending" | "paid" | "shipped",
  "createdAt": "Date",
  "completedAt": "Date"
}
```

Justificación del modelado:

- users y user_profiles

(referencia): Separar la autenticación de la información de perfil es una buena práctica de seguridad. Aunque la relación es 1 a 1, esta separación permite un perfil más flexible y seguro.

- Direcciones en user_profiles (embeber):

La relación es uno-a-pocos. Como un usuario normalmente tiene pocas direcciones, embeber permite una consulta rápida de su información completa.

- products y product_variants (referencia):

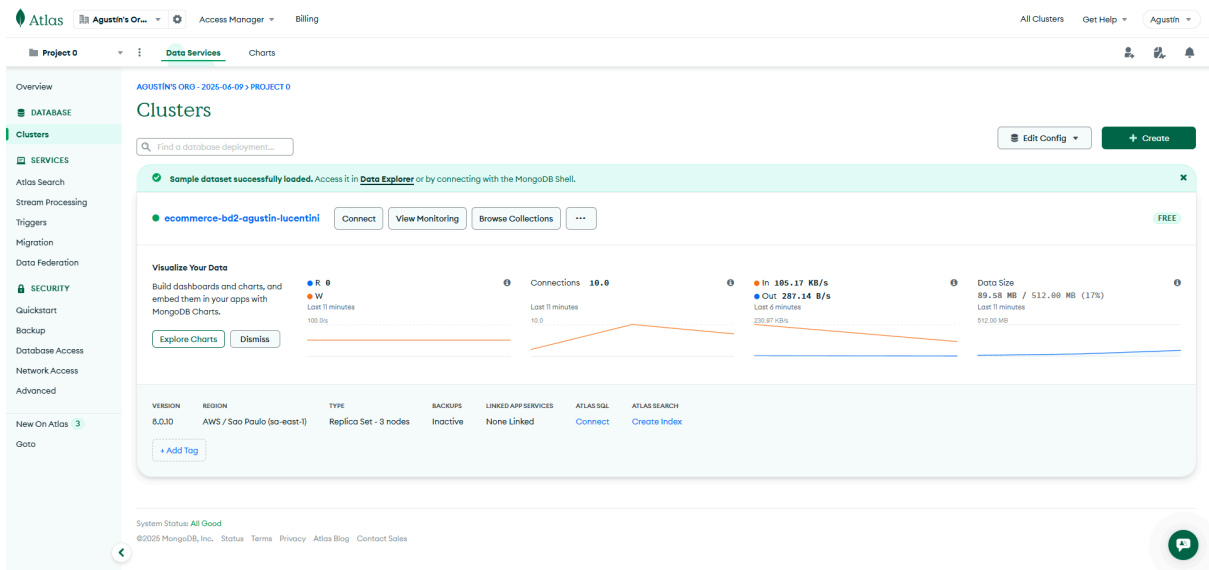
Un producto puede tener muchas variantes. Embeberlas puede exceder los límites de tamaño en MongoDB. Además, se requiere consultar y actualizar stock individualmente, lo cual es más eficiente con referencias.

- items y shippingAddress en orders (embeber):

La información debe quedar congelada al momento de la compra para mantener la integridad histórica. Embeber garantiza que el pedido conserve su estado original, incluso si los datos de producto cambian después.

Fase 2: Configuración del Entorno en MongoDB Atlas

2.1. Despliegue del Clúster



2.2. Administración de la Seguridad

The screenshot shows the MongoDB Atlas interface for the 'Database Access' section. A message at the top states: 'We are deploying your changes (current action: configuring MongoDB)'. Below this is a table with the following data:

User	Description	Authentication Method	MongoDB Roles	Resources	Actions
admin-dev	admin-dev	SCRAM	readWriteAnyDatabase@admin	All Resources	EDIT DELETE
agustin@lucentini	mock-user	SCRAM	atlasAdmin@admin	All Resources	EDIT DELETE
mock-user	mock-user	SCRAM	readAnyDatabase@admin	All Resources	EDIT DELETE

System Status: All Good
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2.3. Preparación de la Conexión

Atlas Agustín's Org - 2025-04-09 > PROJECT 0 Access Manager Billing All Clusters Get Help Agustín

Project 0 Data Services Charts

Overview DATABASE Clusters SERVICES Atlas Search Stream Processing Triggers Migration Data Federation SECURITY Quickstart Backup Database Access **Network Access** Advanced New On Atlas 3 Oato

AGUSTÍN'S ORG - 2025-04-09 > PROJECT 0

Network Access

+ADD IP ADDRESS

You will only be able to connect to your cluster from the following list of IP Addresses:

IP Address	Comment	Status	Actions
191.82.120.17/32 (includes your current IP address)	Created as part of the Auto Setup process	Active	EDIT DELETE
0.0.0.0/0 (includes your current IP address)		Active	EDIT DELETE
191.82.95.98/32	Created as part of the Auto Setup process	Active	EDIT DELETE

System Status: All Good
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Fase 3: Implementación y Población de la Base de Datos

users

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-e-commerce > users Open MongoDB shell

Documents 3 Aggregations Schema Indexes 2 Validation

Type a query: { field: 'value' } or [Generate query](#) [Explain](#) [Reset](#) [Find](#) [Options](#)

[ADD DATA](#) [EXPORT DATA](#) [UPDATE](#) [DELETE](#) 25 1 - 3 of 3

```
_id: ObjectId('68506703865a3a3527c17c64')
email: "cliente1@mail.com"
passwordHash: "hash1"
role: "customer"

_id: ObjectId('68506703865a3a3527c17c65')
email: "admin@mail.com"
passwordHash: "hash2"
role: "admin"

_id: ObjectId('68506703865a3a3527c17c66')
email: "cliente2@mail.com"
passwordHash: "hash3"
role: "customer"
```

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-e-commerce > users Open MongoDB shell

Documents 3 Aggregations Schema **Indexes 2** Validation

[Create](#) [Refresh](#) VIEWING [INDEXES](#) [SEARCH INDEXES](#)

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	20.5 KB	2 (since Mon Jun 16 2025)	UNIQUE	READY
> email_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)		READY

user_profiles:

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > user_profiles

Documents 2

Aggregations

Schema

Indexes 2

Validation

Type a query: { field: 'value' } or [Generate query](#)

Explain

Reset

Find

Options

ADD DATA

EXPORT DATA

UPDATE

DELETE

25

1 - 2 of 2

Navigation icons

```
_id: ObjectId('6850676e865a3a3527c17c6c')
userId: ObjectId('68506703865a3a3527c17c64')
phone: "1111-2222"
addresses: Array (2)
  first_name: "Juan"
  last_name: "Pérez"
```

```
_id: ObjectId('6850676e865a3a3527c17c6d')
userId: ObjectId('68506703865a3a3527c17c66')
phone: "3333-4444"
addresses: Array (2)
  first_name: "Maria"
  last_name: "Gómez"
```

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > user_profiles

Documents 2

Aggregations

Schema

Indexes 2

Validation

Create

Refresh

VIEWING

INDEXES

SEARCH INDEXES

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	20.5 KB	2 (since Mon Jun 16 2025)	UNIQUE	READY
> userId_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)		READY

products

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > products

Documents 2

Aggregations

Schema

Indexes 2

Validation

Type a query: { field: 'value' } or [Generate query](#)

Explain

Reset

Find

Options

ADD DATA

EXPORT DATA

UPDATE

DELETE

25

1 - 2 of 2

Navigation icons

```
_id: ObjectId('685067e3865a3a3527c17c72')
name: "Remera Básica"
description: "Remera 100% algodón"
categoryId: ObjectId('6651aaa00000000000000001')
availableOn: 2024-06-01T00:00:00.000+00:00
deletedAt: null
```

```
_id: ObjectId('685067ec865a3a3527c17c74')
name: "Zapatillas Urbanas"
description: "Zapatillas cómodas para uso diario"
categoryId: ObjectId('6651aaa00000000000000002')
availableOn: 2024-06-05T00:00:00.000+00:00
deletedAt: null
```

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > products

Open MongoDB shell

Documents 2AggregationsSchemaIndexes 2Validation

CreateRefreshVIEWINGINDEXESSearch Indexes

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	20.5 KB	3 (since Mon Jun 16 2025)	UNIQUE	READY
> categoryId_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)		READY

product_variants

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > product_variants

Open MongoDB shell

Documents 3AggregationsSchemaIndexes 2Validation

Type a query: { field: 'value' } or Generate query

ADD DATAEXPORT DATAUPDATEDELETE251 - 3 of 3

```
_id: ObjectId('68506811865a3a3527c17c7a')
productId: ObjectId('685067e3865a3a3527c17c72')
sku: "REM-001-BL-M"
price: 5999.99
stock: 28
attributes: Object
isMaster: true
```

```
_id: ObjectId('68506826865a3a3527c17c7c')
productId: ObjectId('685067e3865a3a3527c17c72')
sku: "REM-001-BL-L"
price: 5999.99
stock: 15
attributes: Object
isMaster: false
```

```
_id: ObjectId('6850686a865a3a3527c17c81')
productId: ObjectId('685067ec865a3a3527c17c74')
sku: "ZAP-001-BL-L"
price: 5999.99
stock: 15
attributes: Object
  color: "Blanco"
  size: "35"
isMaster: true
```

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > product_variants

Open MongoDB shell

Documents 3AggregationsSchemaIndexes 2Validation

CreateRefreshVIEWINGINDEXESSearch Indexes

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	36.9 KB	5 (since Mon Jun 16 2025)	UNIQUE	READY
> sku_1_productId_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)	COMPOUND	READY

orders

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > orders

Documents 1

Aggregations

Schema

Indexes 3

Validation

Type a query: { field: 'value' } or [Generate query](#)

ExplainResetFindOptions

ADD DATAEXPORT DATAUPDATEDELETE

251 - 1 of 1

```
_id: ObjectId('685068d2865a3a3527c17c8b')
userId: ObjectId('68506703865a3a3527c17c64')
items: Array (1)
  0: Object
    variantId: ObjectId('68506811865a3a3527c17c7a')
    productId: ObjectId('685067e3865a3a3527c17c72')
    quantity: 2
    unitPrice: 5999.99
shippingAddress: Object
  type: "shipping"
  street: "Av. Siempre Viva 123"
  city: "Buenos Aires"
  zip: "1000"
  country: "AR"
status: "pending"
createdAt: 2024-06-16T00:00:00.000+00:00
completedAt: null
```

ecommerce-bd2-agustin-l36mstug.mongodb.net > db-ecommerce > orders

Documents 1

Aggregations

Schema

Indexes 3

Validation

CreateRefresh

VIEWINGINDEXESSearch Indexes

Name & Definition	Type	Size	Usage	Properties	Status
> _id_	REGULAR	20.5 KB	2 (since Mon Jun 16 2025)	UNIQUE	READY
> userId_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)		READY
> status_1	REGULAR	20.5 KB	0 (since Mon Jun 16 2025)		READY

4.1. Conexión de Solo Lectura:

ecommerce-bd2-agustin-l36mstug.mongodb.net

Manage your connection settings

While connected, you may only personalize your connection's name, color or favorite status. To fully configure it, you must first disconnect. Beware that disconnecting might cause work in progress to be lost.

Disconnect

URI

mongodb+srv://mock-user:****@ecommerce-bd2-agustin-l36mstug.mongodb.net/

Name

ecommerce-bd2-agustin-l36mstug.mongod

Color

No Color

☐ Favorite this connection

Favoriting a connection will pin it to the top of your list of connections

Cancel

Save

How do I find my connection string in Atlas?

If you have an Atlas cluster, go to the Cluster view. Click the "Connect" button for the cluster to which you wish to connect. [See example](#)

How do I format my connection string?

[See example](#)

4.2. Generación de Reportes Personalizados:

Top 5 Productos más vendidos:

The screenshot shows the MongoDB Aggregations interface. The pipeline is as follows:

```
1 {
2   {
3     $unwind: "$items"
4   },
5   {
6     $group: {
7       _id: "$items.productId",
8       totalSold: {
9         $sum: "$items.quantity"
10      }
11    }
12  },
13  {
14    $lookup: {
15      from: "products",
16      localField: "_id",
17      foreignField: "_id",
18      as: "product"
19    }
20  },
21  {
22    $unwind: "$product"
23  },
24  {
25    $project: {
26      _id: 0,
27      productId: "$_id",
28      name: "$product.name",
29      totalSold: 1
30    }
31  },
32  {
33    $sort: {
34      totalSold: -1
35    }
36  },
37  {
38    $limit: 5
39  }
40 }
```

The pipeline output shows two sample documents:

```
{
  totalSold: 2,
  productId: ObjectId('685067e3865a3a3527c17c72'),
  name: "Remera Básica"
}

{
  totalSold: 1,
  productId: ObjectId('685067ec865a3a3527c17c74'),
  name: "Zapatillas Urbanas"
}
```

Ganancias Mensuales:

The screenshot shows the MongoDB Aggregations interface. The pipeline is as follows:

```
1 {
2   {
3     $unwind: "$items"
4   },
5   {
6     $project: {
7       month: {
8         $month: "$createdAt"
9       },
10      year: {
11        $year: "$createdAt"
12      },
13      revenue: {
14        $multiply: [
15          "$items.unitPrice",
16          "$items.quantity"
17        ]
18      }
19    }
20  },
21  {
22    $group: {
23      _id: {
24        year: "$year",
25        month: "$month"
26      },
27      totalRevenue: {
28        $sum: "$revenue"
29      }
30    }
31  },
32  {
33    $sort: {
34      "_id.year": 1,
35      "_id.month": 1
36    }
37  }
38 }
```

The pipeline output shows a sample document:

```
{
  _id: Object,
  totalRevenue: 17999.97
}
```

Órdenes por usuario:

The screenshot shows the MongoDB Aggregations Builder interface. The pipeline is configured with the following stages:

- \$group**: Groups by `_id: "$userId"` and calculates `orderCount: { $sum: 1 }`.
- \$lookup**: Joins with the `users` collection. `from: "users"`, `localField: "_id"`, `foreignField: "_id"`, `as: "user"`.
- \$unwind**: Unwinds the `$user` array.
- \$lookup**: Joins with the `user_profiles` collection. `from: "user_profiles"`, `localField: "_id"`, `foreignField: "userId"`, `as: "profile"`.
- \$unwind**: Unwinds the `$profile` array.
- \$lookup**: Joins with the `orders` collection. `from: "orders"`, `localField: "_id"`, `foreignField: "userId"`, `as: "orders"`.
- \$project**: Projects the final document structure: `_id: 0`, `userId: "$_id"`, `email: "$user.email"`, `name: "$profile.first_name"`, `last_name: "$profile.last_name"`, `orderCount: 1`, `orders: 1`.

The pipeline output shows two sample documents:

```
{
  "orderCount": 1,
  "orders": Array (1)
  "userId": ObjectId('68596783865a3a3527c17c66')
  "email": "cliente2@mail.com"
  "name": "María"
  "last_name": "Gómez"
}
```

```
{
  "orderCount": 1,
  "orders": Array (1)
  "userId": ObjectId('68596783865a3a3527c17c64')
  "email": "cliente1@mail.com"
  "name": "Juan"
  "last_name": "Pérez"
}
```

Fase 5: Integración con Aplicación Node.js (Patrón Singleton)

Link al repositorio: https://github.com/lucenstuff/parcial_bd_1