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Product Service API Documentation

API Overview

The Product Service provides a RESTful API for managing products in the e-commerce platform. This API follows REST best practices, including proper HTTP verb usage, consistent resource naming, and HATEOAS principles.

Base URL

All API endpoints are relative to the base URL:

```
http://localhost:8080/api/v1
```

Authentication

API endpoints are secured using JWT (JSON Web Token) authentication. Include the JWT token in the Authorization header:

```
Authorization: Bearer <your_token>
```

API Endpoints

Product Management

Get All Products

```
GET /products
```

Query Parameters:

Parameter	Type	Description
page	Integer	Page number (0-based)
size	Integer	Page size
sort	String	Sort field and direction (e.g., <code>name,desc</code>)
category	String	Filter by category
minPrice	Decimal	Minimum price filter
maxPrice	Decimal	Maximum price filter

Response:

```
{
  "content": [
    {
      "id": 1,
      "name": "Product One",
      "description": "Product description",
      "sku": "PRD-001",
      "price": 19.99,
      "category": "electronics",
      "inventoryLevel": 100,
      "createdAt": "2025-05-16T10:30:45Z",
      "updatedAt": "2025-05-16T10:30:45Z",
      "_links": {
        "self": {
          "href": "http://localhost:8080/api/v1/products/1"
        },
        "inventory": {
          "href": "http://localhost:8080/api/v1/products/1/inventory"
        }
      }
    }
  ],
  "page": {
    "size": 20,
    "totalElements": 1,
    "totalPages": 1,
    "number": 0
  },
  "_links": {
    "self": {
      "href": "http://localhost:8080/api/v1/products?page=0&size=20"
    }
  }
}
```

Get Product by ID

```
GET /products/{productId}
```

Path Parameters:

Parameter	Type	Description
productId	Long	Product ID

Response:

```
{
  "id": 1,
  "name": "Product One",
  "description": "Product description",
  "sku": "PRD-001",
  "price": 19.99,
  "category": "electronics",
  "inventoryLevel": 100,
  "createdAt": "2025-05-16T10:30:45Z",
  "updatedAt": "2025-05-16T10:30:45Z",
  "_links": {
    "self": {
      "href": "http://localhost:8080/api/v1/products/1"
    },
    "all-products": {
      "href": "http://localhost:8080/api/v1/products"
    },
    "inventory": {
      "href": "http://localhost:8080/api/v1/products/1/inventory"
    }
  }
}
```

Create Product

POST /products

Request Body:

```
{
  "name": "New Product",
  "description": "Product description",
  "sku": "PRD-002",
  "price": 29.99,
  "category": "home-goods",
  "inventoryLevel": 50
}
```

Response:

```
{
  "id": 2,
  "name": "New Product",
  "description": "Product description",
  "sku": "PRD-002",
  "price": 29.99,
```

```
"category": "home-goods",
"inventoryLevel": 50,
"createdAt": "2025-05-16T10:35:12Z",
"updatedAt": "2025-05-16T10:35:12Z",
"_links": {
  "self": {
    "href": "http://localhost:8080/api/v1/products/2"
  },
  "all-products": {
    "href": "http://localhost:8080/api/v1/products"
  }
}
```

Update Product

```
PUT /products/{productId}
```

Path Parameters:

Parameter	Type	Description
productId	Long	Product ID

Request Body:

```
{
  "name": "Updated Product",
  "description": "Updated description",
  "sku": "PRD-002",
  "price": 34.99,
  "category": "home-goods",
  "inventoryLevel": 45
}
```

Response:

```
{
  "id": 2,
  "name": "Updated Product",
  "description": "Updated description",
  "sku": "PRD-002",
  "price": 34.99,
  "category": "home-goods",
  "inventoryLevel": 45,
  "createdAt": "2025-05-16T10:35:12Z",
```

```
"updatedAt": "2025-05-16T10:40:23Z",
"_links": {
  "self": {
    "href": "http://localhost:8080/api/v1/products/2"
  },
  "all-products": {
    "href": "http://localhost:8080/api/v1/products"
  }
}
```

Delete Product

```
DELETE /products/{productId}
```

Path Parameters:

Parameter	Type	Description
productId	Long	Product ID

Response:

204 No Content

Inventory Management

Update Product Inventory

```
PUT /products/{productId}/inventory
```

Path Parameters:

Parameter	Type	Description
productId	Long	Product ID

Request Body:

```
{
  "quantity": 75
}
```

Response:

```
{
  "productId": 2,
  "inventoryLevel": 75,
  "updatedAt": "2025-05-16T10:45:03Z",
  "_links": {
    "product": {
      "href": "http://localhost:8080/api/v1/products/2"
    }
  }
}
```

Product Categories

Get All Categories

```
GET /categories
```

Response:

```
{
  "categories": [
    "electronics",
    "home-goods",
    "apparel",
    "books",
    "beauty"
  ],
  "_links": {
    "self": {
      "href": "http://localhost:8080/api/v1/categories"
    }
  }
}
```

Get Products by Category

GET /categories/{categoryName}/products

Path Parameters:

Parameter	Type	Description
categoryName	String	Category name

Response:

Same format as the Get All Products endpoint, filtered by the specified category.

Error Responses

All error responses follow a standard format:

```
{
  "timestamp": "2025-05-16T10:50:12.345Z",
  "status": 404,
  "error": "Not Found",
  "message": "Product with id 999 not found",
  "path": "/api/v1/products/999"
}
```

Common Error Codes

Status Code	Description
400	Bad Request - Invalid input data
401	Unauthorized - Authentication required
403	Forbidden - Insufficient permissions
404	Not Found - Resource not found
409	Conflict - Resource already exists
422	Unprocessable Entity - Validation error
500	Internal Server Error - Server-side error

Rate Limiting

The API implements rate limiting to prevent abuse:

- 100 requests per minute per IP address
- 1000 requests per hour per authenticated user

Rate limit headers are included in all responses:

```
X-Rate-Limit-Limit: 100
X-Rate-Limit-Remaining: 95
X-Rate-Limit-Reset: 1621234567
```

Pagination

All collection endpoints support pagination with the following parameters:

- **page**: Page number (0-based)
- **size**: Page size (default: 20, max: 100)
- **sort**: Sort field and direction (e.g., **name,asc**)

Pagination metadata is included in the response:

```
"page": {
  "size": 20,
  "totalElements": 42,
  "totalPages": 3,
  "number": 0
}
```

HATEOAS Links

All responses include HATEOAS links for navigation. Common link relations:

- **self**: Link to the current resource
- **all-products**: Link to the products collection
- **inventory**: Link to the product's inventory

- `first`, `prev`, `next`, `last`: Pagination links