Modules with Hybrid Approach, Placeholder Products, Keywords

1. **Definitions:**

- **Entities:** In the context of establishing relationships between data, entities are essentially modules. Each entity comes with properties, which are the input fields or information contained within the modules.
- **Product Placeholder:** A product placeholder is a virtual or temporary product designed to optimize data linking between modules and properties of other modules. It serves the purpose of facilitating efficient connections between different entities.

2. **Data Flow Concept:**

To illustrate the linking approach between (1. Seller, 2. Product, 2. Category, 3. Brand, 4. Use Case, and 5. Application 6. buyer modules), we need to establish a fundamental Data Flow Concept.

Basic data flow between entities

Admin/Seller Creates:

- Category
- Product

Then Products belong to Category -Product is the Node

And Product has Brand.

And Product has Use Case

And Product has Application.

And Product has Buyer.

Basic data flow between keywords of entities - *only for clarifying concept I prepared another file in deep details.*

Keywords:

- Category has keywords
- Product has keywords-Transfer to Category
- Brand has keywords, **Transfer to product**
- Use Case has keywords- **Transfer to product**
- Application has keywords- **Transfer to product**

3. **Relationships and Concepts:**

- **Bidirectional Relationship:** Example, between product and category, where the product is related to the category, but not vice versa; the category belongs to the product.
- **Hybrid Relationship:** Example, Multiple brands can belong to one category, or one brand may be related to many categories.
- **Transitive Relationship:** Example: A seller is connected to a category through the product node, not directly.

Applying Relationships between entities:

Various approaches can be employed.

1. The simplest is the direct approach, where entities are linked directly. However, this approach may not be efficient, potentially disrupting the flow of data. A more effective strategy is to link through the product.
2. The correct is Product Holder Approach: The Product Holder Approach introduces a special product, visible or invisible to buyers, optimized ideally for serving as a hub for linking entities together. In cases like Power Cozmo, where linking is necessary in the absence of actual products.

Product Holder Functionality:

1. Link products to categories, brands, applications, and use cases: Product holders establish relationships between products and other entities, creating a comprehensive and interconnected product ecosystem.
2. Manage product keywords: Product holders can add and edit keywords associated with products, improving search functionality and user experience.

Entities properties (field associated with) and relationship between entities.

1. Categories Module -alternatively "Categories Entity"

   Entity Properties:

   - Category Name: Required, input field.
   - Parent Category: Manual selection
   - Description: Required, input field.
   - Popular Brands: Automatic and manual addition based on products and user interactions.
   - Product Applications: Automatic and manual addition based on products.
   - Use Cases: Automatic and manual addition based on products.
   - Subcategories: Manual selection
   - Keywords: Added by Admin.

   Relationships:

   - Bi-directional with Product (Category-Product)
   - Hybrid with Brand (Category-Brand)
   - Hybrid with Application (Category-Application)
   - Hybrid with Use Case (Category-Use Case)
   - Transitive with Seller (Category-Seller) through Product nodes
   - Transitive with User (Category-User) through Product and Use Case nodes.

2. Brands Module: alternatively, "Brands Entity"

   Entity Properties:

   - Brand Name: Required, input field.
   - Categories: Automatic suggestion with manual override based on products and user feedback.
   - Description: Required, input field.
   - Linked Companies: Input field or automatic identification
   - Products: Automatic connection based on product information.
   - Related Categories: Automatic and manual addition based on product relationships and user feedback.
   - Keywords: Added by Admin.

   Relationships:

   - Bi-directional with Product (Brand-Product)
   - Bi-directional with Seller (Brand-Seller)
   - Hybrid with Category (Brand-Category)
   - Transitive with Application (Brand-Application) through Product nodes
   - Transitive with Use Case (Brand-Use Case) through Product and Application nodes

3. Product Applications Modules- alternatively "Product application Entity"

   Properties:

   - Application Name: Required, input field.

- Description: Required, input field.
- Related Categories: Automatic suggestion with manual override based on connected products and placeholder products information.
- Related Use Cases: Automatic and manual addition based on product relationships and placeholder product information.
- Keywords: Added by Admin

Relationships:

- Bi-directional with Product (Product-Application)
- Hybrid with Category (Application-Category)
- Transitive with Brand (Application-Brand) through Product nodes
- Transitive with Use Case (Application-Use Case)

4. Use Cases Module- alternatively "Product use Case Entity

Properties:

- Use Case Name: Required, input field.
- Description: Required, input field.
- Related Applications: Automatic connection based on product relationships and placeholder product information.
- Related Products: Automatic connection based on product relationships and placeholder product information.
- Keywords: Added by Admin

Relationships:

- Bi-directional with Product (Product-Use Case)
- Hybrid with Category (Use Case-Category)
- Transitive with Brand (Use Case-Brand) through Product

5. Products module- alternatively "product Entity"

Properties

- Product Name: Required, input field.
- Brand: Assigned by product holder or automatically linked.
- Category: Assigned by product holder or automatically linked
- Description: Required, input field.
- Applications: Automatic and manual addition based on functionalities
- Use Cases: Automatic and manual addition based on functionalities.
- Keywords: Added by both product holders and sellers
- Placeholder (boolean): Indicates whether the product is a temporary placeholder.

Relationships:

- Bi-directional with Category (Category-Product)
- Bi-directional with Brand (Brand-Product)

- Bi-directional with Application (Product-Application)
- Bi-directional with Use Case (Product-Use Case)
- Transitive with Seller (Product-Seller)

6. Placeholder Products Module- alternatively “Place holder Entity”

   Properties:

   - Placeholder Name: Manually or automatically generated.
   - Associated Brand: Assigned by admin or automatically linked.
   - Associated Category: Assigned by admin or automatically linked.
   - Description: Optional, editable by admin
   - Keywords: Added by admin
   - Placeholder for Product ID: References the actual product when it becomes available.

   Relationships:

   - Hybrid with Category (Placeholder-Category): Established by admin or automatically suggested based on associated brand and category.
   - Hybrid with Application (Placeholder-Application): Established by admin or automatically suggested based on associated products and placeholder information.
   - Hybrid with Use Case (Placeholder-Use Case): Established by admin or automatically suggested based on associated products and placeholder information.

7. Seller’s modules- alternatively “Seller Entity”

   Properties:

   - Seller Name: Required, input field.
   - Contact Information: Required, input field.
   - Products Offered: Automatically linked based on product information.
   - Seller Keywords: Define seller expertise and offered products.

   Relationships:

   - Bi-directional with Brand (Brand-Seller)
   - Bi-directional with Product (Product-Seller)