<https://gemini.google.com/u/1/app/a7603b60134369c2>

<https://gemini.google.com/u/1/app/42a77d08d7a45bcb>

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Production-Ready Specification: public.trail\_difficulty\_levels\_master Table

Version: 2.1 (V2.1 Checklist REV 05-18-25-A Applied)

Date: May 18, 2025

1\. Purpose & Primary Use-Cases

Stores the definitive list of trail difficulty levels (e.g., Easy, Moderate, Challenging) that can be assigned to trails, routes, and curated itineraries. This provides a structured, translatable, and manageable way to classify difficulty across the platform.

\*Key User-Story Touchpoints:\*

- Pilgrim (Anna): Enables understanding and filtering of routes/itineraries by difficulty (A1, A2, A7).

- Platform Administrator (Admin Team) / Regional Content Manager (Sofia): Allows management of available difficulty levels and consistent assignment (D1, D2).

2\. Schema

| Column | Data Type | Constraints | Description (Translatable fields marked) |

| `id` | `integer` | Primary Key, Generated always as identity | Unique identifier for each difficulty level. |

| `code` | `text` | Not Null, Unique, `CHECK (char\_length(code) <= 50 AND code = upper(code) AND code ~ '^[A-Z\_]+$')` | Stable, machine-readable code (e.g., "EASY"). Uppercase, letters, underscores. Max 50 chars. |

| `name` | `text` | Not Null, Unique, `CHECK (char\_length(name) <= 100)` | Display name in the base language (English). (Translatable) Max 100 chars. |

| `description` | `text` | Nullable | Short description of the difficulty level in the base language (English). (Translatable) |

| `icon\_identifier` | `text` | Nullable, `CHECK (icon\_identifier IS NULL OR char\_length(icon\_identifier) <= 100)` | Optional identifier for an icon representing this difficulty level. Max 100 chars. |

| `sort\_order` | `integer` | Not Null, Default `0` | Optional integer for display order in UI lists/filters. |

| `is\_active` | `boolean` | Not Null, Default `true` | Whether the difficulty level is active and available for assignment/display. |

| `created\_at` | `timestamp with time zone` | Not Null, Default `now()` | Timestamp of record creation. |

| `created\_by\_profile\_id` | `uuid` | Foreign Key to `public.profiles(id)` ON DELETE SET NULL, Nullable | Profile ID of the user who created this record. |

| `updated\_at` | `timestamp with time zone` | Not Null, Default `now()` | Timestamp of last update (auto-updated by trigger). |

| `updated\_by\_profile\_id` | `uuid` | Foreign Key to `public.profiles(id)` ON DELETE SET NULL, Nullable | Profile ID of the user who last updated this record. |

3\. PostgreSQL DDL

SQL

```

CREATE TABLE public.trail\_difficulty\_levels\_master (

id INTEGER GENERATED ALWAYS AS IDENTITY PRIMARY KEY,

code TEXT NOT NULL UNIQUE CHECK (char\_length(code) <= 50 AND code = upper(code) AND code ~ '^[A-Z\_]+$'),

name TEXT NOT NULL UNIQUE CHECK (char\_length(name) <= 100), -- (Translatable)

description TEXT, -- (Translatable)

icon\_identifier TEXT CHECK (icon\_identifier IS NULL OR char\_length(icon\_identifier) <= 100),

sort\_order INTEGER NOT NULL DEFAULT 0,

is\_active BOOLEAN NOT NULL DEFAULT true,

created\_at TIMESTAMPTZ NOT NULL DEFAULT now(),

created\_by\_profile\_id UUID REFERENCES public.profiles(id) ON DELETE SET NULL,

updated\_at TIMESTAMPTZ NOT NULL DEFAULT now(),

updated\_by\_profile\_id UUID REFERENCES public.profiles(id) ON DELETE SET NULL

);

-- Indexes

CREATE INDEX IF NOT EXISTS idx\_trail\_difficulty\_levels\_master\_is\_active ON public.trail\_difficulty\_levels\_master(is\_active);

CREATE INDEX IF NOT EXISTS idx\_trail\_difficulty\_levels\_master\_sort\_order ON public.trail\_difficulty\_levels\_master(sort\_order);

CREATE INDEX IF NOT EXISTS idx\_trail\_difficulty\_levels\_master\_created\_by ON public.trail\_difficulty\_levels\_master(created\_by\_profile\_id) WHERE created\_by\_profile\_id IS NOT NULL;

CREATE INDEX IF NOT EXISTS idx\_trail\_difficulty\_levels\_master\_updated\_by ON public.trail\_difficulty\_levels\_master(updated\_by\_profile\_id) WHERE updated\_by\_profile\_id IS NOT NULL;

-- Comments

COMMENT ON TABLE public.trail\_difficulty\_levels\_master IS 'Master lookup table for trail difficulty levels (e.g., Easy, Moderate). Name and description are translatable. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.id IS 'PK. Unique identifier for each difficulty level. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.code IS 'Stable, machine-readable code (e.g., "EASY"). Uppercase, letters, underscores. Max 50 chars. Must be unique. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.name IS 'Display name of the difficulty level (Base language: English). Translatable via public.translations. Max 100 chars. Must be unique. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.description IS 'Short description of the difficulty level (Base language: English). Translatable via public.translations. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.icon\_identifier IS 'Optional identifier for an icon representing this difficulty level. Max 100 chars. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.sort\_order IS 'Optional integer for display order in UI lists/filters. Lower numbers display first. Default 0. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.is\_active IS 'Whether the difficulty level is active and available for assignment/display. Default true. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.created\_at IS 'Timestamp of record creation. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.created\_by\_profile\_id IS 'Profile ID of the user who created this record. FK to public.profiles.id. Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.updated\_at IS 'Timestamp of last update (auto-updated by trigger). Version 2.1.';

COMMENT ON COLUMN public.trail\_difficulty\_levels\_master.updated\_by\_profile\_id IS 'Profile ID of the user who last updated this record. FK to public.profiles.id. Version 2.1.';

-- Initial Population Example (adapt 'PUT\_SYSTEM\_USER\_UUID\_HERE' as needed)

INSERT INTO public.trail\_difficulty\_levels\_master (code, name, description, icon\_identifier, sort\_order, created\_by\_profile\_id, updated\_by\_profile\_id) VALUES

('EASY', 'Easy', 'Suitable for most fitness levels, relatively flat terrain.', 'difficulty\_easy\_icon', 10, 'PUT\_SYSTEM\_USER\_UUID\_HERE', 'PUT\_SYSTEM\_USER\_UUID\_HERE'),

('MODERATE', 'Moderate', 'Some inclines or uneven terrain, requires a reasonable level of fitness.', 'difficulty\_moderate\_icon', 20, 'PUT\_SYSTEM\_USER\_UUID\_HERE', 'PUT\_SYSTEM\_USER\_UUID\_HERE'),

('CHALLENGING', 'Challenging', 'Steep inclines, rugged terrain, for experienced hikers.', 'difficulty\_challenging\_icon', 30, 'PUT\_SYSTEM\_USER\_UUID\_HERE', 'PUT\_SYSTEM\_USER\_UUID\_HERE'),

('VERY\_CHALLENGING', 'Very Challenging', 'Long distances, significant elevation changes, potentially exposed sections, requires high fitness and experience.', 'difficulty\_very\_challenging\_icon', 40, 'PUT\_SYSTEM\_USER\_UUID\_HERE', 'PUT\_SYSTEM\_USER\_UUID\_HERE');

-- Seed corresponding English 'name' and 'description' into public.translations table.

```

4\. Triggers/Functions

- Audit Metadata Trigger:

SQL

```

-- Assuming public.set\_master\_table\_audit\_meta() is defined (see terrain\_types\_master example)

CREATE TRIGGER trigger\_trail\_difficulty\_levels\_master\_audit\_meta

BEFORE INSERT OR UPDATE ON public.trail\_difficulty\_levels\_master

FOR EACH ROW

EXECUTE FUNCTION public.set\_master\_table\_audit\_meta();

```

\*Comment on Trigger\*: Manages `created\_at`, `updated\_at`, `created\_by\_profile\_id`, and `updated\_by\_profile\_id` columns.

- Orphaned Translation Cleanup Trigger:

SQL

```

CREATE OR REPLACE FUNCTION public.cleanup\_trail\_difficulty\_levels\_master\_translations()

RETURNS TRIGGER AS $$

BEGIN

DELETE FROM public.translations

WHERE table\_identifier = 'trail\_difficulty\_levels\_master'

AND row\_foreign\_key = OLD.id::text;

RETURN OLD;

END;

$$ LANGUAGE plpgsql SECURITY DEFINER;

ALTER FUNCTION public.cleanup\_trail\_difficulty\_levels\_master\_translations() SET search\_path = public;

CREATE TRIGGER trigger\_cleanup\_trail\_difficulty\_levels\_master\_translations

AFTER DELETE ON public.trail\_difficulty\_levels\_master

FOR EACH ROW

EXECUTE FUNCTION public.cleanup\_trail\_difficulty\_levels\_master\_translations();

```

\*Comment on Trigger\*: After a difficulty level is deleted, this trigger removes associated translations for its `name` and `description` from `public.translations`.

5\. JSON Schema Mirror

JSON

```

{

"title": "trail\_difficulty\_level\_master",

"description": "Master lookup table for trail difficulty levels (e.g., Easy, Moderate). Name and description are translatable. Version 2.1.",

"type": "object",

"properties": {

"id": {

"type": "integer",

"readOnly": true,

"description": "PK. Unique identifier for each difficulty level. Version 2.1."

},

"code": {

"type": "string",

"maxLength": 50,

"pattern": "^[A-Z\_]+$",

"description": "Stable, machine-readable code (e.g., \"EASY\"). Uppercase, letters, underscores. Max 50 chars. Must be unique. Version 2.1."

},

"name": {

"type": "string",

"maxLength": 100,

"description": "Display name of the difficulty level (Base language: English). Translatable via public.translations. Max 100 chars. Must be unique. Version 2.1."

},

"description": {

"type": ["string", "null"],

"description": "Short description of the difficulty level (Base language: English). Translatable via public.translations. Version 2.1."

},

"icon\_identifier": {

"type": ["string", "null"],

"maxLength": 100,

"description": "Optional identifier for an icon representing this difficulty level. Max 100 chars. Version 2.1."

},

"sort\_order": {

"type": "integer",

"default": 0,

"description": "Optional integer for display order in UI lists/filters. Lower numbers display first. Default 0. Version 2.1."

},

"is\_active": {

"type": "boolean",

"default": true,

"description": "Whether the difficulty level is active and available for assignment/display. Default true. Version 2.1."

},

"created\_at": {

"type": "string",

"format": "date-time",

"readOnly": true,

"description": "Timestamp of record creation. Read-only. Version 2.1."

},

"created\_by\_profile\_id": {

"type": ["string", "null"],

"format": "uuid",

"description": "Profile ID of the user who created this record. FK to public.profiles.id. Read-only. Version 2.1.",

"readOnly": true

},

"updated\_at": {

"type": "string",

"format": "date-time",

"readOnly": true,

"description": "Timestamp of last update (auto-updated by trigger). Read-only. Version 2.1."

},

"updated\_by\_profile\_id": {

"type": ["string", "null"],

"format": "uuid",

"description": "Profile ID of the user who last updated this record. FK to public.profiles.id. Read-only. Version 2.1.",

"readOnly": true

}

},

"required": [

"code",

"name",

"sort\_order",

"is\_active",

"created\_at",

"updated\_at"

],

"primary\_key": ["id"],

"unique\_constraints": [

{"columns": ["code"], "name": "trail\_difficulty\_levels\_master\_code\_key"},

{"columns": ["name"], "name": "trail\_difficulty\_levels\_master\_name\_key"}

]

}

```

6\. Relationships & Integrity

- This is a parent table.

- Referenced by `curated\_itineraries.overall\_difficulty\_level\_id` and potentially other tables like `routes` and `segments`. Referencing FKs should typically use `ON DELETE SET NULL` or `ON DELETE RESTRICT`.

- Audit FKs to `public.profiles(id)`.

7\. Multilingual Strategy

- `name` and `description` store base language (English) text.

- Translations managed in `public.translations`, linked by `table\_identifier = 'trail\_difficulty\_levels\_master'`, `column\_identifier = 'name'` or `'description'`, and `row\_foreign\_key = trail\_difficulty\_levels\_master.id::TEXT`.

- An `AFTER DELETE` trigger handles orphan cleanup.

8\. Role-Based Workflow & RLS Notes

- Workflow: `is\_active` flag. Audit columns track changes.

- RLS Policies: Admins have full CUD. Authenticated/Anonymous users have `SELECT` on active levels.

9\. ENUM vs Lookup Discussion

- This table \*is\* the result of promoting a previous `trail\_difficulty\_enum` for better translatability, metadata (icons, sort order), and manageability.

10\. UI/UX Enablement

- `name` (translated), `icon\_identifier`, `sort\_order` power UI filters and displays. `is\_active` filters selection lists.

11\. Auditing & Lifecycle Management

- Audit Columns: `created\_at`, `updated\_at`, `created\_by\_profile\_id`, `updated\_by\_profile\_id`.

- Lifecycle: `is\_active` flag. `ON DELETE RESTRICT` or `SET NULL` from referencing tables.

12\. Scalability & Future-Proofing

- Small table, easily extensible.

13\. Seed Data

- Initial seed data for `code`, `name` (base English), `description`, `icon\_identifier`, `sort\_order`, and audit FKs required.

- Corresponding English `name` and `description` translations to be seeded into `public.translations`. (Example DDL includes seed data for the master table).

14\. Next-Action Checklist

- 🔴 Implement DDL: Create `public.trail\_difficulty\_levels\_master` with audit columns, indexes, and comments.

- 🔴 Implement Audit Trigger: Apply `public.set\_master\_table\_audit\_meta` (or similar).

- 🔴 Implement Orphaned Translation Cleanup Trigger.

- 🔴 Populate Seed Data: Insert initial difficulty levels into this table and their English names/descriptions into `public.translations`.

- 🟠 Implement RLS Policies.

- 🟠 Verify FK constraints in referencing tables (e.g., `curated\_itineraries`) point correctly.

- 🟢 Ensure Admin UI uses this table for difficulty level management and selection.

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