Technical workshop: Validation of the prototype for the new hazardous event and disaster losses and damages tracking system

Session 4: Administration and governance of the tracking system
Introduction
System Administration

- System architecture
- Data model customization
- Translation
- User permissions
- Data flow
- Hosting
System Architecture
High Level Architecture

Front-end → Backend Server → Database
Customization
Customization

- **Effects**: Add additional fields to Effects
- **Events**: Add additional fields to Event
- **Assets**: Add additional assets to Assets vocabulary
- **Regions**: Adding regions / administrative boundaries
Customization: Events and Effects

- The system will allow countries to localize the system by adding additional questions / fields to **Events** and **Effects** when collecting data.
- The system will come with **standardized core fields** defined by UNDRR that should not be modified to ensure data interoperability.
Customization: Sectors & Assets

- The system will allow countries to add additional sectors and sub-sectors to meet their local needs. Default sectors will be provided in the system by UNDRR and partners that they will be encouraged to use.
- The system will allow addition / localization of custom asset types e.g. building / crop types.
Asset Taxonomies

- To support interoperability and comparison between countries, the system will support linking the assets to a “coding” or taxonomy system.

Permanent Building
Code: 24-595

Konak
Code: 24-595

```json
{
    "resourceType" : "AssetType",
    "id" : "A20424",
    "status" : "final",
    "sector" : "Housing",
    "code" : {
        "coding" : [{
            "system" : "https://www.undrr.org/dldt/codes/assettypes",
            "code" : "24-595",
            "display" : "Permanent Houses"
        }]
    }
}
```
# Administrative Levels

<table>
<thead>
<tr>
<th>Column</th>
<th>Type</th>
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<tbody>
<tr>
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<td>District</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
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<td>country</td>
<td>string</td>
<td>DL</td>
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# Administrative Divisions

<table>
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</tr>
<tr>
<td>polygon</td>
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</table>
Translations

- The DLDT system will be built to support multiple languages. System administrators will be able to choose from the available languages for a given country’s DLDT server.
- As the DLDT will be Open Source, countries will be able to contribute translations in order to increase the number of languages available.
- During the prototype phase, the DLDT is only available in English.
# Translations

<table>
<thead>
<tr>
<th>Sector Table</th>
<th>Sector Translation Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column</td>
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<tr>
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<td>string</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
</tr>
<tr>
<td>status</td>
<td>string</td>
</tr>
<tr>
<td>user_created</td>
<td>uuid</td>
</tr>
<tr>
<td>user_updated</td>
<td>uuid</td>
</tr>
<tr>
<td>date_created</td>
<td>date</td>
</tr>
</tbody>
</table>

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User Permissions
User Permissions

- Based on an Attribute-Based Access Control model (ABAC), as opposed to Role Based Access Control (RBAC).
- ABAC takes into account more than the user’s role and rank, but also the type of data and the type of action the user seeks to perform, and helps avoid creating an unmanageable number of roles to account for different use cases over time.

<table>
<thead>
<tr>
<th>Collection</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Countries</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Damage</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Disruptions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Effects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Events</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
User Permissions

- **Data type:** This is the type of data being acted upon, such as an administrative division, a sector, or an effect.

- **Action** This includes the following:
  - Creating
  - Viewing
  - Updating
  - Deleting

- **Geographical constraints.** A user may be allowed to perform a set of actions on a particular set of data types only within a given location, or set of locations. For example, a user may be delegated a sector or region to input damage.

- **Audit logs.** Actions performed on any given object will be logged on the basis of the first three considerations for better accountability. In addition, revisions will be stored for Records, Effects and Events.
Workflow example
Workflow example

User X
Role: Admin
Workflow example

User X
Role: Admin

User A
Role: Editor

User B
Role: Editor

User C
Role: Editor
Administrator creates Record 1

Record
Agriculture
Region A

Admin

User A

User B

User C
Assigns Record 1 to User A
Administrator creates Record 2

Record
Agriculture
Region A

Record
Energy
Region B

User A
User B
User C
Assigns Record 2 to User B

- **Admin**
  - Record: Agriculture
    - Region A
  - Record: Energy
    - Region B

- **User A**
- **User B**
- **User C**
Administrator creates Record 3

Record
Agriculture
Region A

Record
Energy
Region B

Record
Housing
Region C

User A
User B
User C
Assigns Record 3 to User C
Users add Effects

- Admin
  - Record: Agriculture, Region A
  - Record: Housing, Region C
  - Record: Energy, Region B

User A
User B
User C
Users add Effects

- Record
  - Agriculture
    - Region A
  - Energy
    - Region B
  - Housing
    - Region C

Admin

User A

User B

User C
Users add Effects

- Record Agriculture Region A
- Record Energy Region B
- Record Housing Region C
Users add Effects

Admin

Record
Agriculture
Region A

Record
Energy
Region B

Record
Housing
Region C

User A

User B

User C
Admin approves + publishes Records

Admin

Record
Agriculture
Region A

Record
Energy
Region B

Record
Housing
Region C
Admin approves + publishes Records

- Record
  - Agriculture
  - Region A

- Record
  - Energy
  - Region B

- Record
  - Housing
  - Region C

Published data
Admin approves + publishes Records

- **Record**
  - Agriculture
  - Region A

- **Record**
  - Energy
  - Region B

- **Record**
  - Housing
  - Region C

- Published data
- Analytics

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Data flow
Data flow

Source DLDT Server  
e.g. Country DLDT Server

Manual Transfer

Automated Transfer

Destination DLDT Server  
e.g. Global DLDT Server
Data Flow

Countries may choose to share data with the Global DLDT Server in one of two ways:

- **Manual Transfer.** Users will export data from a country-hosted DLDT server, make any necessary adjustments, and upload the file into the Global DLDT server.

- **Automatic Transfer.** A country may opt to use direct, automated transfers to the Global DLDT server. This will reduce the administrative overhead of the transfers, but reduce the opportunity to make adjustments as needed.

In all cases, UNDRR and partners will be responsible for data held in the global server. It must thus conform to UN guidelines. Crucially, geographical information will be shown within UN national borders. It may also exclude internal administrative boundaries.

The use of universally unique IDs (UUIDs) allows event data to be traced across systems, making it easy to link back to the source data.
Hosting
Hosting Options

**UNDRR Hosted**

1. UNDRR and partners will provide the options to countries to host a version of the system on their behalf.
2. Countries will be able to localize to their country needs using built in configurations.
3. Countries will retain control of their data but will have to make choices reflecting their data sovereignty policies.
4. UNDRR will manage hosting, security updates and upgrades.

**Self Hosting**

1. UNDRR will provide packaged code with instructions on how to install. Updates will be provided at some announced frequency.
2. User will be responsible for providing hosting. Can be on-premise or in the cloud.
3. User bears the responsibility of managing the instance, and handling updates.
4. User will need to have or contract technical staff to manage system components. UNDRR recommended external contractors will be available to hire to support systems.
5. It will be possible to hold data entirely inside a country’s borders.
Feedback Questions

▪ What are some ways you might customize the data model? What kinds of custom fields might you add to events and effects?

▪ In terms of sharing data with a global or regional instance, which method would you choose? Why?

▪ What are potential challenges of sharing data from country instances with the global instance?

▪ Does the proposed system administration cover all of what you would expect in a Disaster Losses and Damages Tracking system?
Thank you

For more information, please contact...
<table>
<thead>
<tr>
<th>Column</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>uuid [PK]</td>
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<tr>
<td>name</td>
<td>string</td>
<td>External Event name</td>
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<tr>
<td>hazard</td>
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<td>EQ</td>
</tr>
<tr>
<td>glide</td>
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<tr>
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<td>2023-04-22 19:41:50.221+00</td>
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</table>
# Effects

<table>
<thead>
<tr>
<th>Column</th>
<th>Type</th>
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</tr>
</thead>
<tbody>
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<td>uuid</td>
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<tr>
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</tbody>
</table>
## Hosting Options

<table>
<thead>
<tr>
<th>Global DLAS</th>
<th>Cloud-hosted country instance</th>
<th>On-premise/in-country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hosted on UN Cloud</td>
<td>1. Hosted on 3rd-party service provider such as Microsoft Azure, or Amazon Web Services.</td>
<td>1. Deployment artifacts and system requirements will be provided.</td>
</tr>
<tr>
<td>2. This will contain shared country data, but will be under the sole control of UNDRR and partners.</td>
<td>2. As this is a managed service, it will have lower staffing requirements than an on-premise option. It will still, however, require countries to maintain some technical staff to manage deployments.</td>
<td>2. Automated deployment scripts may also be provided for specific environments, such as Kubernetes.</td>
</tr>
<tr>
<td>3. This will be managed by a technical team drawn from UNDRR and partners.</td>
<td>3. Countries will have sole control of data, but will have to make choices reflecting data sovereignty policies.</td>
<td>3. The country bears the responsibility of managing the instance, and handling updates.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Countries will need to have or contract technical staff to manage system components</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. It will be possible to hold data entirely inside a country’s borders</td>
</tr>
</tbody>
</table>
Hosting

- **Laws and regulations.** Local laws and regulations on data governance may impact the available hosting options. Countries with restrictive data sovereignty laws will have fewer commercial hosting options, for example, since data can only be processed within their borders.

- **Digital and Data Maturity.** Countries in earlier phases of digital maturity may opt for a set-up with lower technical staffing requirement, enabling them to take advantage of the ecosystem, but limiting opportunities to customize the tools. Countries further along in their maturity may prioritise customizability over ease of deployment.

- **Cost.** Depending on available resourcing, it may be more cost effective to host in the cloud, or in a local data center.