UN/LOCODE Application Re-engineering

Presentation by

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UN/LOCODE Application Re-engineering

Overview of the presentation:

1. The (existing) UN/LOCODE Application

2. Assessment and Technical Steps (Development Platform, Target Software Revision)

3. The Work Plan (Critical Cyber Security Vulnerabilities)

4. Overview of Possible Improvements

   - Third-party services are required for interactive mapping and visualization of UN/LOCODE data and validation of geolocation data fields via (ESRI - ArcGIS, Google Maps, or Open Street Maps).

5. Proposed UI Wireframe of Re-engineered Front-end Application

6. Question and Answer (Q&A)

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The (existing) UN/LOCODE Application

The current UN/LOCODE system, including its IT web interface, was developed almost two decades ago. Since then, IT systems, including cyber security needs have evolved considerably. This resulted in a situation where the UN/LOCODE web interface (i.e., the web-based online Data Maintenance Request application), was flagged by the Office of Information and Communications Technology (OICT) as non-compliant with UN cyber security requirements, and the rest of the system has not been audited. This was reflected in the UNECE Executive Secretary Compact assessment for 2021 as well as in para. 24 of **UNLOCODE-AG/2022/INF.2.**

The system comprises of three (3) sub-systems:

Subsystem 1 – DMR Submission (Entry Portal), Subsystem 2 – DMR Validation, and Subsystem 3 – Directory Publication.

- UNECE has set a new target date of **30 December 2023** to resolve the cyber security risk and follow OICT Recommendations.

Issues with the current system can be categorized as:

Critical Cyber Security Vulnerabilities
Data Quality and Validation Errors
User Friendliness
Outdated Business Logic, Workflow and Technical Source Code
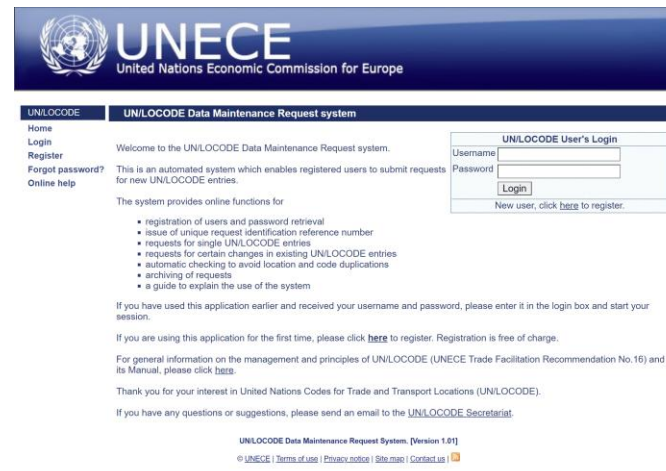
● HIGH ● MEDIUM ● LOW ● LOWEST
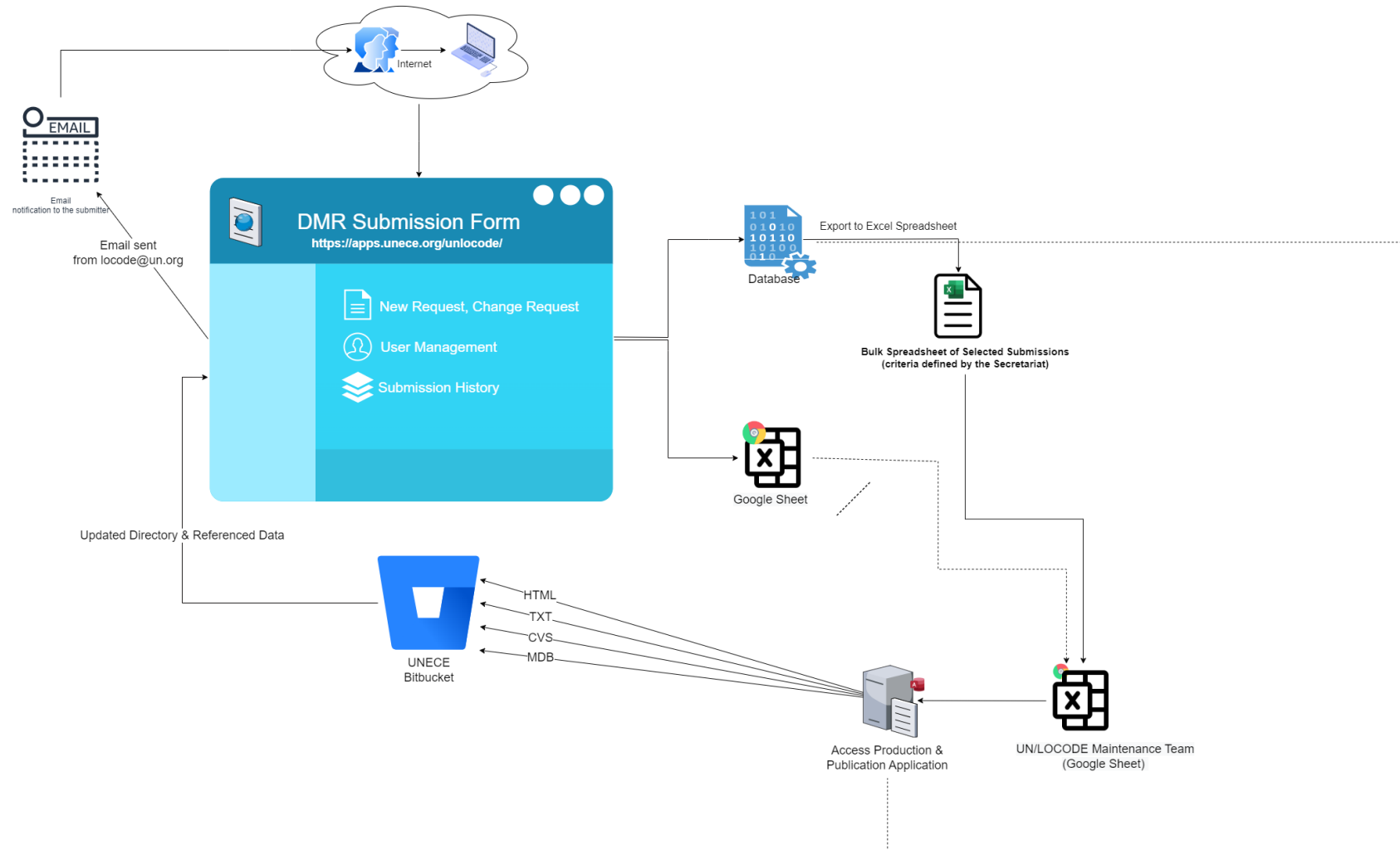
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Current UN/LOCODE Application

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Assessment and Technical Steps

- Reuse of the existing application platform and infrastructure (Microsoft IIS and Microsoft SQL Server)

- Initial redevelopment of the application will be via a Local Development Infrastructure, the application will then be ported to the UNECE Infrastructure.

- The existing software SDK .NET Framework 4.0 will be migrated to the latest release .NET Framework 4.8.1.

- ECE Jira Platform for issue tracking, comments, and documentation. (https://jira.unece.org/projects/UR/issues/)

- ECE Bitbucket Platform for code revision management. (https://bitbucket.unece.org/projects/UNLOCODE/repos/unlocode_development/browse)

- End user testing conducted by the UNECE Secretariat, UN/LOCODE Taskforce and interested user community members.

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Overview of the Work Plan

Priority	Importance	Category	Sub-Category	Fix / Functionality	Impact Page(s)	Component(s)	Estimated time for Dev and Test (Days)	Comments
1	Critical	Security	SQL Injection	replace all in-line SQL code with the use of database stored procedures	all pages	web database	14	
2	Critical	Security	user credentials	store the user password as hash (with a salt) in the database. Passwords cannot be retrieved (user will have to create a new password)	register edit user profile forgot pasword	database	5	
3	Critical	Security	user credentials	enforce password policy (i.e., complexity rules)	register edit user profile forgot pasword	web database	6	Passwords cannot be retrieved (user will have to create a new password)
4	Critical	Security	Multi-factor authentication	user email multi-factor authentication (verify user's email by user entering emailed random code and system verify it before allowing registration/login/editing user profile)	login register edit user profile	web	6	
5	Improvements	Security	website authentication	add ability to have asp.net forms authentication so that website pages are only accessible if user is authenticated its also possible restrict access of folders via web.config	all pages	web	2	this can be done on web with form-based authentication or directy on web server by Hakan
6	Improvements	Security	Error Handling	Any errors from the system (database and web) should not display the actual (sql) error in the web browser. Browser should only display the fact that an error occurred and display an error internal ID. The actual error and its details should be stored in a database table (internal ID, user, time stamp and technical error message).	login logout new DMR Request request DMR change previous history edit user profile register user online help forgot password	database web	5	
7	Improvements	Security	etrade user on database	set proper database server permission for the etrade user (in sql server)	N/A	database	3	The specific permission are to be set directly on database by Hakan. Etrade user should not be ablel to view the list of databases, nor the list of tables at a min
8	Improvements	Data Quality/Validation	latitude and longitude	add leading zero when necessary, based on expected format	new DMR request	web database	3	

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Priority	Importance	Category	Sub-Category	Fix / Functionality	Impact Page(s)	Component(s)	Estimated time for Dev and Test (Days)	Comments
9	Improvements	Data Quality/Validation	latitude	validate expected format (ddmmN or S) where dd=degrees (00 to 90) and mm=minutes (00 to 59)	new DMR request	web database	3	
10	Improvements	Data Quality/Validation	longitude	validate expected format (dddmmE or W) where ddd=degrees (000 to 180) and mm=minutes (00 to 59)	new DMR request	web database	3	
11	Improvements	Data Quality/Validation	subdivision	add check to make subdivision entry mandatory	new DMR request	web	3	
12	Improvements	Data Quality/Validation	web link	this field is mandatory and use regex to validate a web link	new DMR request	web database	3	
13	Improvements	Data Quality/Validation	user contact details	check for mandatory fields and check valid email and phone	edit user profile user registration	web database	3	
14	Improvements	Data Quality/Validation	latitude and longitude	add ability to select coordinates by clicking on a map (using popup window) and transfer selected coordinates to main form (converted/formatted to degrees/minutes)	new DMR request	web	4	
15	Improvements	Data Quality/Validation	subdivision	subdivision - elements to show up as dropdown list and data from database (ISO)	new DMR request	web database	3	
16	Improvements	Data Quality/Validation	un locode code	drop down list to select the 2-char country + 3 letter as code for the location name. 3 characters will automatically include check to ensure no zero and nor one characters are used	new DMR request	web database	3	
17	Improvements	Data Quality/Validation	un locode code	on the popup window where coordinates are selected by clicking on map, add checkbox to ask user confirmation that user has checked that the coordinates are within country and sub-divison. Button to select the coordinates for transfer to main form only enabled when both checkboxes are checked	new DMR request	web	2	
18	Improvements	Data Quality/Validation	latitude and longitude	check if DMR is a duplicate / already exists (min: coordinates and locode name should be unique). Include checks for same coordinates but very similar name (i.e., requested name is contained in an existing locode name)	new DMR request	web database	4	
19	Improvements	Data Quality/Validation	Data Quality/Validation	all checks/data validation from existing javascript/Jquery to be done in c# and/or in SQL database	login new DMR request request for change edit contact details forgot password	web database	15	
20	Improvements	Data Quality/Validation	latitude and longitude	check that latitude and longitude should be within country/region or subdivision specified. Take into account other countries/island that are outside main country (e.g. UK and Gibraltar, France and French islands)	new DMR request	web	10	This will require key/licence to be able to user web service from open source map / google map / bing map, etc. Same for open source web service (geo names). The free open source service "geo names" is free, but requires user registration. The free version is restricted to 20000 web service calls per day per user and 1000 web service calls per user per hour
21	Improvements	Technical	source code improvement	all functions should be coming from database and displayed accordingly	new DMR request	web database	2	
22	Improvements	Technical	source code improvement	check button (which gets list of existing data which selected country and location like the the one trying to request) - should get the data from the database	new DMR request	web database	5	
23	Improvements	Technical	source code improvement	add table - use c# data table and data grid instead of html table	new DMR request	web database	5	
24	Improvements	Technical	source code improvement	Functions for Border, fix the number from B to 8	new DMR request	web	1	

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Overview of Possible Improvements

- Field Validation

- Integrated Geolocation Referencing

- Data Quality

- User Notifications

- Electronic Data Service

- Data Integration

- 2FA/MFA

Easier Geolocation Referencing
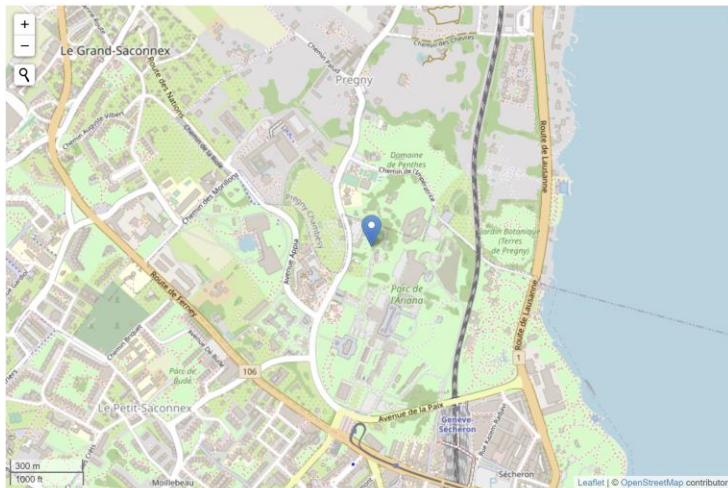
Form Field Validation

Two-Factor Authentication

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Challenges

- Complexity in the source code and legacy software development pattern

- Cost of third-party services for mapping platforms, ext. i.e., API quotas QPM (request per day).

- Availability of reference data i.e., sub-division geographical data

- Data integration between the sub-systems

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**Wireframe
Re-engineered
frontend submission**

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Wireframe Internal System Menu

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**Wireframe
DMR
Submission Form**

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Wireframe
DMR Summary Page

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Wireframe
Previous Request History Page

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**Wireframe
Edit Contact Details
Page**

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Wireframe
Request For Code Change Page

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https://apps.unece.org/unlocode/