

UN/LOCODE Application Re-engineering



UN / CEFAC



Presentation by

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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)

UN/LOCODE Application Re-engineering



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 [UN/LOCODE-AG/2022/INF.2](#).

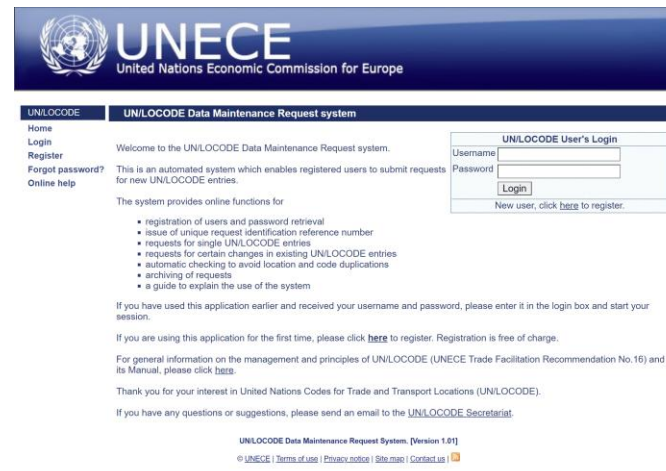
The system comprises of three (3) sub-systems:

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Outdated Business Logic, Workflow and Technical Source Code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

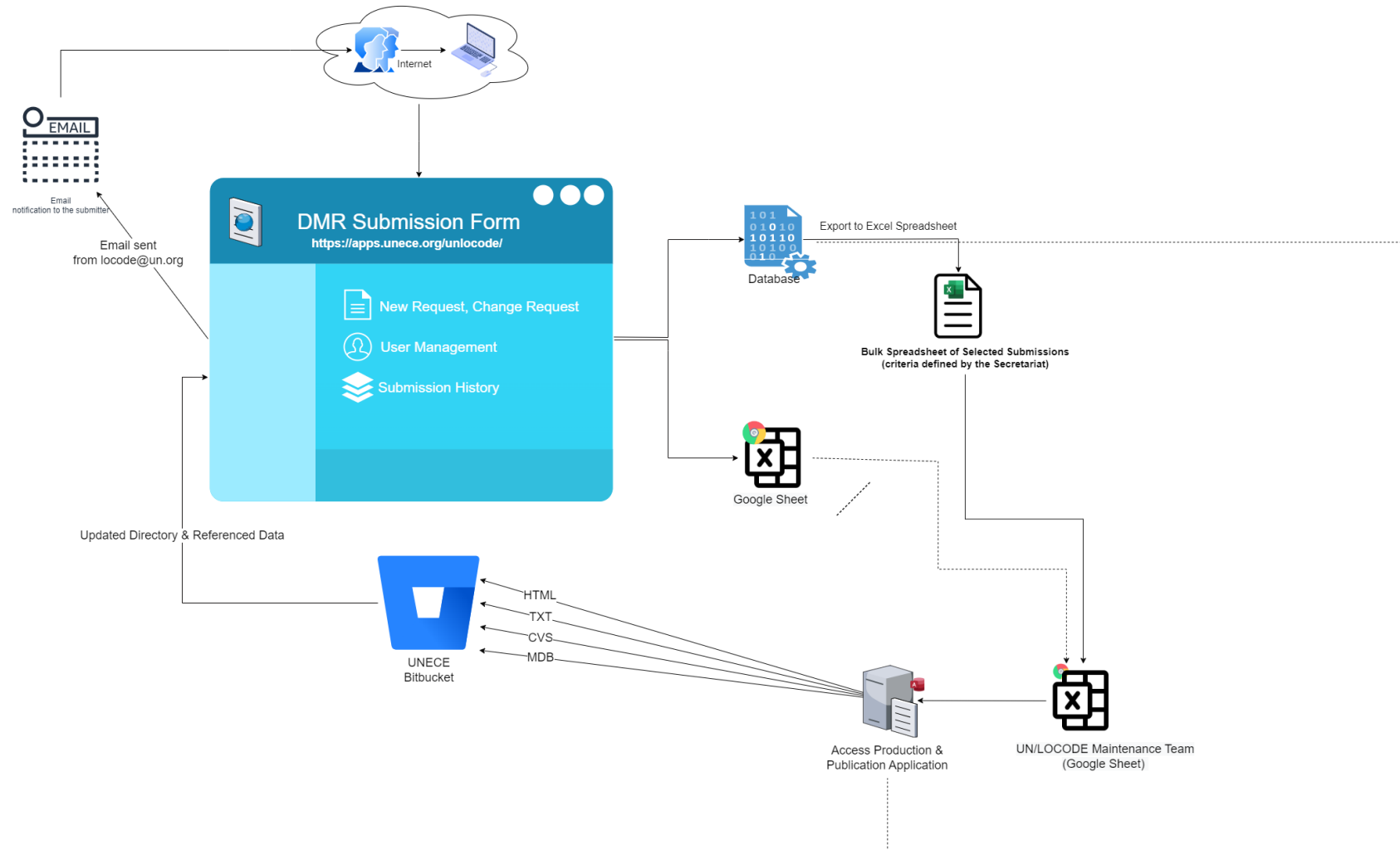
28/09/2023

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

UN/LOCODE Application Re-engineering



Current UN/LOCODE Application



UN/LOCODE Application Re-engineering



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.

UN/LOCODE Application Re-engineering



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 password	database	5	
3	Critical	Security	user credentials	enforce password policy (i.e., complexity rules)	register edit user profile forgot password	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 directly 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 able 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	

UN/LOCODE Application Re-engineering



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
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 new DMR request 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-division. 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 locodename 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 use 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 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 8 to 8	new DMR request	web	1	

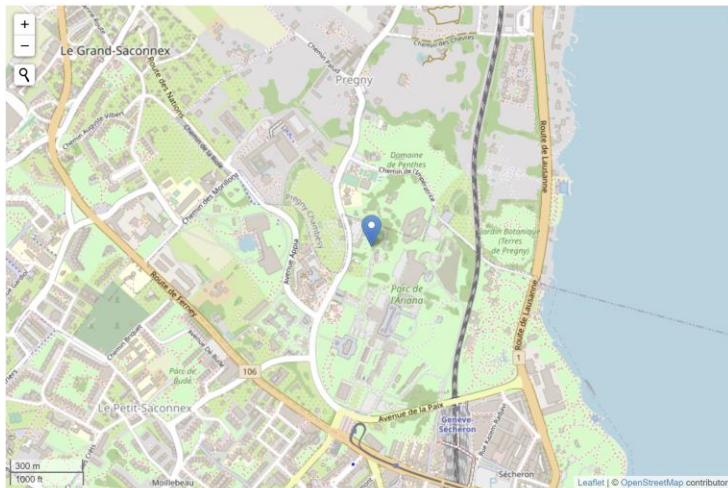
UN/LOCODE Application Re-engineering



Overview of Possible Improvements

- Field Validation
- User Notifications
- 2FA/MFA
- Integrated Geolocation Referencing
- Electronic Data Service
- Data Quality
- Data Integration

Easier Geolocation Referencing



Latitude: 46.22907491832074
Longitude: 6.140112876882091

Form Field Validation

Name
This field is required.

City

State

Email
Please enter a valid email address.

Two-Factor Authentication

Enter 6-digit code sent to your email address.

1 3 4 . . .

CONTINUE

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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

UN/LOCODE Application Re-engineering





UNECE

United Nations Economic Commission for Europe

Menu

- Home
- Login
- Register
- Forgot password?
- Online help

UN/LOCODE Data Maintenance Request system

Welcome to the UN/LOCODE Data Maintenance Request system.

This is an automated system which enables registered users to submit requests for new UN/LOCODE entries.

The system provides online functions for

- registration of users and password retrieval
- issue of unique request identification reference number
- requests for single UN/LOCODE entries
- requests for certain changes in existing UN/LOCODE entries
- automatic checking to avoid location and code duplications
- archiving of requests
- a guide to explain the use of the system

If you have used this application earlier and received your username and password, please enter it in the login box and start your session.

If you are using this application for the first time, please click [here](#) to register. Registration is free of charge.

For general information on the management and principles of UN/LOCODE (UNECE Trade Facilitation Recommendation No.16) and its Manual, please click [here](#).

Thank you for your interest in United Nations Codes for Trade and Transport Locations (UN/LOCODE).

If you have any questions or suggestions, please send an email to the [UN/LOCODE Secretariat](#).

UN/LOCODE User's Login

[Forgot password?](#) [Register](#)

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Wireframe
Re-engineered
frontend submission

UN/LOCODE Application Re-engineering



Wireframe
2FA
Authentication
Page

UN/LOCODE Application Re-engineering



The wireframe shows the user interface for the UN/LOCODE Data Maintenance Request system. At the top, there is a header with the UNECE logo and name. Below this is a navigation menu on the left side with links for Home, Login, Register, Forgot password?, and Online help. The main content area is titled "UN/LOCODE Data Maintenance Request system" and contains a user profile box with the following information: User name: kevinb, UNECE [Contact name: Kevin Bishop], Address: Palais des Nations, 8-14 Avenue de la Paix, and E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8461 | Fax: [redacted]. A link for "Requestor details: Edit" is provided. Below the profile box, there is a section titled "Choose an option from the list below" with a bulleted list of options: Request for new entries using single entry form, Request for changes, Previous request history (from year 2006 onwards), Edit your contact details, and Logout. A note at the bottom of the main content area states: "Note: After the successful submission of your request(s), you will receive by emails sent to the address you registered an invitation link to attend the UN/LOCODE maintenance team conference calls. You are welcome to attend these weekly UN/LOCODE maintenance meetings to explain your need to create a code for this or these location(s) in order to facilitate the validation of your and all received Data Maintenance Requests. Your attendance is required to explain the reason for your request and to answer questions that the maintenance team may have about it. If you, or a representative from your organization, are unable to attend, your request(s) may be **delayed** or **rejected**." At the bottom of the wireframe, there is a footer with the text: "UN/LOCODE Data Maintenance Request System. [Re-engineering Wireframe] © UNECE | Terms of use | Privacy notice | Site map | Contact us |".

Wireframe
Internal System
Menu

UN/LOCODE Application Re-engineering



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Menu

- Home
- Login
- Register
- Forgot password?
- Online help

UN/LOCODE Data Maintenance Request system

User name: kevinb
UNECE [Contact name: Kevin Bishop]
Address: Palais des Nations, 8-14 Avenue de la Paix
E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8461 | Fax:

Requestor details: Edit

Please read below new rules for submission of requests

Country: (Local name in Latin characters, including any diacritical marks)

Location name:

Subdivision:

UN/LOCODE: (Two-letter country code, plus proposed three-letter code for location name. Please do not use neither 0 or 1)

Functions:

- 1 Port
- 2 Rail
- 3 Road
- 4 Air
- 5 Postal Exchange
- 6 Multimodal
- 7 Fixed Transport
- B Border

Geolocation:

Latitude: Longitude:

Web link:

(Please don't use "" or *)


For help, click here. Quick link to <http://www.maplandia.com>

Click "add" to move your request to a temporary table and free the input fields for adding another request

Wireframe
DMR
Submission Form

UN/LOCODE Application Re-engineering





UNECE

United Nations Economic Commission for Europe

Menu

- Home
- Login
- Register
- Forgot password?
- Online help

UN/LOCODE Data Maintenance Request system + Summary of DMR Entries

User name: kevinb
UNECE [Contact name: Kevin Bishop] [Requestor details: Edit](#)
Address: Palais des Nations, 8-14 Avenue de la Paix
E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8461 | Fax:

Summary of DMR Entries

UN Log Number	Country	Code	Sub Division	Long	Lat	
UN-2023-67961	USA	R3M	TX	3025N	09820W	✕
UN-2023-67963	USA	HF5	FL	2811N	08108W	✕


[Add Additional DMR Entry +](#) [Submit DMRs](#)

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Wireframe
DMR Summary Page

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- Home
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- Forgot password?
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UN/LOCODE Data Maintenance Request system + Previous request history page

User name: kevinb [Requestor details: Edit](#)
UNECE [Contact name: Kevin Bishop]
Address: Palais des Nations, 8-14 Avenue de la Paix
E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8461 | Fax:

This page will display previous requests received by the UN/LOCODE Secretariat from the year 2006 onwards, with unique request-reference numbers and dates of receipt.

PrintHistory of requests for new entries that marked as 'Noted'.


No previous 'Request for new entry' history found.

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Wireframe
Previous Request
History Page

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Menu

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UN/LOCODE Data Maintenance Request system + update contact details

User name: kevinb [Requestor details: Edit](#)
UNECE [Contact name: Kevin Bishop]
Address: Palais des Nations, 8-14 Avenue de la Paix
E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8461 | Fax:

Name of the requestor (company/organization):

Name of the contact person:

Postal address:

E-mail address:

Phone number:

Fax number:

Username:


Password:

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Wireframe
Edit Contact Details
Page

UN/LOCODE Application Re-engineering





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UN/LOCODE Data Maintenance Request system + Previous request history page

User name: kevinb
UNECE [Contact name: Kevin Bishop]
Address: Palais des Nations, 8-14 Avenue de la Paix
E-mail ID: kevin.bishop@un.org | Phone: +41 (0) 22-917-8481 | Fax: [Requestor details: Edit](#)

Please read:

- According to UN/LOCODE Recommendation and practices, changes in *place names* will be accepted only from official and authoritative sources.
- Changes of existing *LOCODEs* will be accepted only exceptionally and when convincing reasons have been presented, or when it can be established that the existing code has never been put into actual use.
- Changes in *subdivisions* will be accepted only when evidence is presented that a published subdivision code is erroneous.
- Changes of *functions* will be accepted if the existing entry is incomplete or erroneous.
- Completion of coordinates will be encouraged where they are missing and accepted if the published coordinates are not correct. In principle, no other requests for changes will be entertained.
- However, UN/LOCODE users are welcome to put forward any observations that they may have on particular UN/LOCODE entries.
- Once you click the submit button, your request will be sent to the automated UN/LOCODE Data Maintenance Request system. The system will send a response message to inform you that the request has been received.
- A unique request reference will be issued and should be referred to in any communication with the UN/LOCODE Secretariat.
- The UN/LOCODE Secretariat will process the requests and - if approved - integrate them in the bi-annual publication of UN/LOCODE.
- The standard publication schedule of UN/LOCODE issues is at the end of January and July each year. A cut-off date is set two months before the publication, i.e. November 30 for first issue of the year and May 31 for the second issue. Any requests arriving after the cut-off date will be processed in the next publication.
- If you have any other question, please email to the [UN/LOCODE Secretariat](#).

Send a message on request for change:

Fill in the current UN/LOCODE and Location name. (Example CHGVA Genève)

UN/LOCODE	Location name

Fill in the requested changes for the above entry. (Limited to 245 characters.)

[Submit Request](#)

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Wireframe
Request For Code Change
Page

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