

18 November 2019

Economic Commission for Europe

UNECE Executive Committee

Centre for Trade Facilitation and Electronic Business

UN/LOCODE Advisory Group

Third annual meeting

Xiamen, 27-28 November 2019

Business requirement analysis

for

UN/LOCODE Re-engineering Project (URP)

Version 1.8

Prepared by UN/LOCODE Re-engineering Project Team

2019-11-11

Table of Contents

Centre for Trade Facilitation and Electronic Business	1
1. Introduction	1
1.1 Background.....	1
1.2 Purpose.....	2
1.3 Document conventions.....	2
1.4 Intended audience and reading suggestions	2
1.5 User Documentation	2
1.6 References	2
2. Overall description	2
2.1 System overview.....	2
2.2 System Features.....	3
2.3 Actors/Roles.....	4
2.4 UN/LOCODE Maintenance.....	5
2.4.1 Maintenance procedures	5
2.4.2 DMR Category	6
2.4.3 DMR Status.....	6
2.4.4 DMR Validation	7
2.4.5 DMR Validation Rules.....	7
2.4.6 DMR Life Cycle Diagram	8
3. Use Cases	10
3.1 Description of use cases	10
3.2 Category of use cases	10
3.3 Overview of use cases	10
4. Interface Requirements.....	11
4.1 User Interface	11
4.2 APIs.....	12
Appendix A: Project documentation naming convention and repository structure	13
Appendix B: Analysis on the UNECE Recommendation 16	16
B.1 Structure.....	16
B.2 Contents	16
B.2.1 Recommendation.....	16
B.2.2 Guidelines	16
B.2.3 Annexes.....	16
B.3 Issues related to system development.....	17
Appendix C: Glossary	19
C.1 UNECE.....	19
C.2 UN/CEFACT	19
C.3 UN/LOCODE.....	19
C.4 UNECE Recommendation No.16.....	19
C.5 UN/LOCODE Advisory Group.....	19
C.6 UN/LOCODE Maintenance Team	19
C.7 Data Maintenance Request (DMR).....	19

C.8 UN/LOCODE Focal Point Network.....	20
C.9 UN/LOCODE National Focal Point.....	20
Appendix D: System deployment.....	21
Appendix E: List of use cases.....	23
E.1 List of business use cases.....	23
E.1.1 Use case 1: DMR Submission	23
E.1.2 Use Case 2: DMR Validation	25
E.1.3 Use Case 3: Directory Publication	26
E.1.4 Use Case 4: Search UN/LOCODE	28
E.2 List of administrative use cases	29
E.2.1 Use Case 5: User Registration	29
E.2.2 Use case 6: User Login	30
E.2.3 Use Case 7: User Profile Maintenance.....	31
E.2.4 Use Case 8: Password Retrieval.....	32
E.2.5 Use Case 9: Access Control	34
E.2.6 Use Case 10: Workflow Configuration	35

Revision history

Name	Date	Reason for changes	Version
Xuefeng Sun/Jun Li	2019-8-5	Initial outline	1.1
Yan Zhang	2019-8-7	Comments from the secretariat to update the outline	1.2
Xuefeng Sun/Jun Li	2019-9-27	First draft	1.3
Xuefeng Sun/Jun Li	2019-10-15	First draft	1.4
Yan Zhang	2019-10-25	Finalization of use cases	1.5
Wenfeng Sun Xuefeng Sun Jun Li	2019-11-11	Revision of texts Redraw of use case diagrams	1.6
Markus Pikart	2019-11-12	Review use case E.1.2 (DMR Validation) and 2.3,2.4,2.5 and 3	1.7
Yan Zhang	2019-11-14	Finalization of the draft	1.8

1. Introduction

1.1 Background

The "United Nations Code for Trade and Transport Locations" is commonly more known as "UN/LOCODE". Although managed and maintained by the United Nations Economic Commission of Europe (UNECE), it is the product of a wide collaboration in the framework of the joint trade facilitation effort undertaken within the United Nations.

UN/LOCODE is currently maintained and published by the UNECE secretariat with the assistance of the UN/LOCODE Focal Point Network and the UN/LOCODE Advisory Group. The publications of UN/LOCODE directory are currently released twice per year on the UNECE website free of charge (<https://www.unece.org/cefact/locode/welcome.html>). It is specified in the UNECE Recommendation 16 (https://www.unece.org/fileadmin/DAM/cefact/recommendations/rec16/rec16_rev3_ecetrd227.pdf). Considering that the resulting webpages and subsequent downloads account for over 80% of the total visits on the UNECE website, UN/LOCODE is a 'flag-ship product' of UNECE.

The current UN/LOCODE system was developed in house to manage Data Maintenance Requests submission, generating and publication of UN/LOCODE directory more than fifteen years ago. It is using Microsoft ACCESS (back-end system) with a planned volume of 10000 entries and automatic generation of the UN/LOCODE directories. This was supplemented a few years later by a Microsoft .NET + MS SQL server (front-end system) destined to receive Data Maintenance Request (DMR) submissions online.

Since the first UN/LOCODE conference in 2015, the business community has attached an importance to urgency of re-engineering the UN/LOCODE system. Because changes in the UN/LOCODE maintenance procedure driven by establishing the UN/LOCODE Focal Point Network and setup of the UN/LOCODE Maintenance Team to assist in Data Maintenance Request validation and improving data quality, cannot be supported by the current system, it causes a big workload burden in the secretariat to coordinate and collaborate among the stakeholders with manual intervention.

At the Second UN/LOCODE Advisory Group Annual Meeting in October 2018 in Hangzhou, China, the China National Institute of Standardization (CNIS) volunteered to provide resources to support the secretariat to re-engineer the UN/LOCODE system with modern technology based on new business requirements. This was recorded in the conference report (ECE/TRADE/C/CEFACT/2019/23) and reported to the last UN/CEFACT Plenary in April 2019. The UN/CEFACT Chair expressed the gratitude to CNIS and encouraged the UNECE secretariat to move it forward as soon as possible.

1.2 Purpose

This business requirement analysis report serves as a basis for the future design and development of the UN/LOCODE system. It is one of the outputs of the UN/LOCODE Re-engineering Project (URP) at its first stage. Based on the Terms of Reference (ToRs) of the URP, this document aims at:

- a) Understanding the revised UNECE Recommendation 16;
- b) Forming a common understanding between the development team, the secretariat, focal points and experts involved in the UN/LOCODE maintenance work; and
- c) Documenting the procedures of the UN/LOCODE maintenance undertaken by the UN/LOCODE Maintenance Team for the sake of more efficiency and higher data quality.

1.3 Document conventions

This document is in line with the project documentation naming convention and repository structure (See Appendix A).

1.4 Intended audience and reading suggestions

This document aims at putting understanding of both business community and the project team on the same page. The new UN/LOCODE system will be developed based on the business requirements clarified in this document.

1.5 User Documentation

See Appendix A for details.

1.6 References

- *Terms of Reference of Re-engineering the UN/LOCODE system;*
- *Recommendation 16 3rd edition, UN/LOCODE CODES FOR PORTS AND OTHER LOCATIONS.*
- *Revision of Recommendation 16 Project (20190425 version)*
- Nonfunctional requirements (Under development);
- *Mandates and Terms of Reference of the Advisory Group on the United Nations Code for Trade and Transport Locations (UN/LOCODE);*
- *Terms of Reference for the UN/LOCODE Focal Points;*
- *UNECE supported ICT Platforms;*

2. Overall description

2.1 System overview

According to the mainstream concept to design modern information systems, the new system will be designed with multiple layers and by separating data access from business logic, as shown in Figure 1, which illustrates the system architecture of the future UN/LOCODE system.

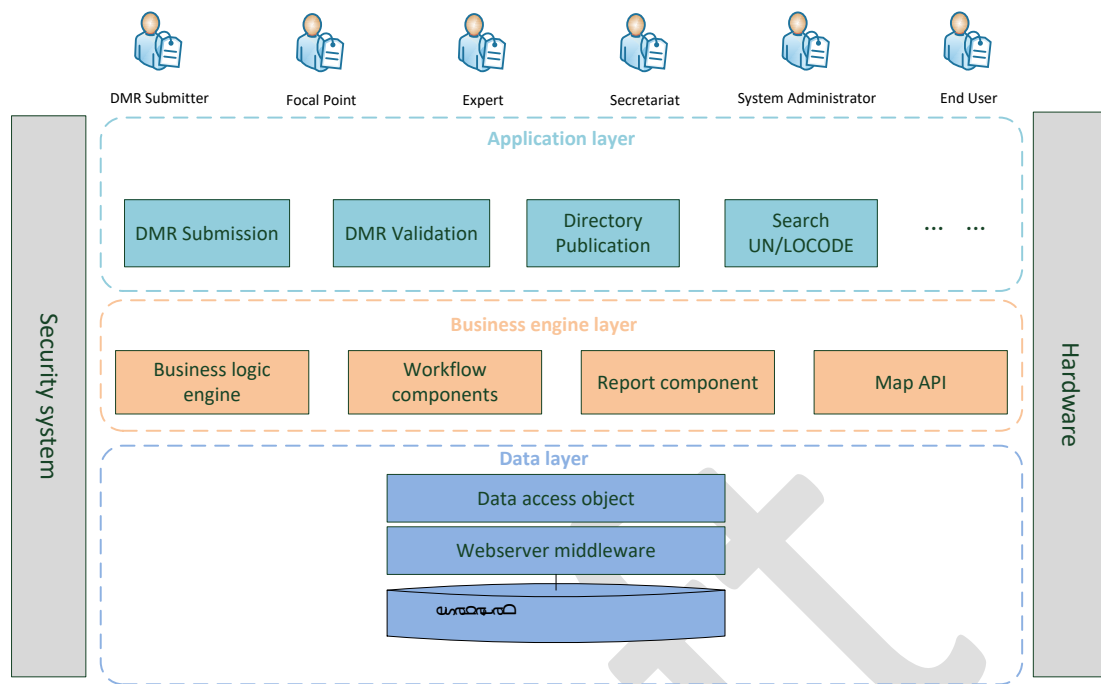


Figure 1 - System architecture

In Figure 1, three layers (the Application layer, the Business engine layer and the Data layer), which are collaborated to support the activities of Actors/Roles, are shown and explained as follows:

- The Application layer includes the group of functionalities provided by the system to serve Actors/Roles to perform the business activities, such as the UN/LOCODE maintenance through DMRs.
- The Business engine layer includes components or APIs, to support the functionalities in the Application layer, such as Map API, workflow components, report components.
- The Data layer is used to deal with data storage, access and retrieval, including three sublayers, i.e. Database, Webserver middleware and Data Access Object.

Note: As shown in Figure 1, all three layers depend on the hardware and the security system to function:

- The hardware includes servers, network environment, etc.
- The security system includes all equipment and software related to security, and relevant restriction rules to be complied in the system.

2.2 System Features

The system will be developed with the principles as shown in Table 1.

Feature	Description
---------	-------------

An integrated system	Unlike the current system which runs on the different platforms (.NET and ACCESS Database), the new system should be an integrated one that supports the UN/LOCODE maintenance and publication.
Mainstream technologies	The system will use modern technologies supported in the existing UN ICT environment (e.g. operating system, database server, development platform, etc.), for the ease of the development, the maintenance and the enhancement of the system.
Free of risk on licenses	Any license issue of this system should be sorted out before the system development.
Efficient access to external data	In order to share the official information from the external data provider, like ISO 3166, the system will design an automatic or semi-automatic data interface to the external databases.
Management flexibility	The UN/LOCODE maintenance procedures are determined by the UN/LOCODE Advisory Group. The decisions made by the Group might be subject to new business needs and proposals triggered by best practices of the UN/LOCODE Maintenance Team. The system is expected to support various workflow configured flexibly based on rules and policies specified in the Recommendation 16 and decisions made by the Group.
Easy to use	UN/LOCODE is used widely in the world. The main use of the system is for users to look up UN/LOCODEs with various search criteria. The search results can be customized and exported in different formats. According to the ToRs, the system will only support English. Considering different jurisdictional and cultural background of users, this system will be designed easy to use with the mainstream design principles.
Expansibility	The system might be expanded to be used for maintenance and publication of other directories in the UN/CEFACT library.

Table 1 - List of system features

2.3 Actors/Roles

The roles, identified for the new system, represent actors to perform a series of tasks within the system. It can be a human or other external system. Who takes a given role depending on the scenario, in line with rules and policies specified in the UNECE Recommendation No. 16 and decided by the secretariat. One role is taken by a user group and one person might take multiple roles. For example, the person could request for a new code as a Data Maintenance Request (DMR) Submitter; the same person could be an expert in the Maintenance Team or could look up UN/LOCODEs for the business purpose as an end user.

- **DMR Submitter**

Submits a UN/LOCODE Data Maintenance Request (DMR) to the system for validation by the UN/LOCODE Maintenance Team. The DMR could be either a request for a new code or a request for modification on an existing UN/LOCODE entry, including for deletion of an existing entry.

- **Focal Point**

To improve the quality of UN/LOCODE, UNECE established a UN/LOCODE Focal Point Network. This network consists of National Focal Points nominated by governments and Institutional Focal Point nominated by international or regional organizations, such as IMO, ITU, IATA, UPU, EMSA. Focal Points maintain and further develop the UN/LOCODE standard in the best interest of the user community. They support an open, transparent and inclusive maintenance process on an ongoing basis.

- **Expert**

Contributes his or her expertise to validate DMRs as a member of the UN/LOCODE Maintenance Team. The Maintenance team reviews DMRs which should be processed by the team based on the scope defined in the workflow configuration, for example those that have not been reviewed by a National Focal Point. The maintenance team is composed of the Focal Points, experts and the secretariat.

The maintenance team meetings are held regularly on a voluntary basis by the maintenance team members with invited DMR Submitters.

- **Secretariat**

Is in charge of management and coordination of UN/LOCODE maintenance and publication, including secretariat support to the UN/LOCODE Advisory Group, organization, coordination and support to the UN/LOCODE Maintenance Team, publication of the UN/LOCODE directory and liaison with key stakeholders.

- **System Administrator**

Is responsible for the uptime, performance, resources, security, data backup and recovery of the system.

- **End User**

The end user is the group of people that need to use UN/LOCODE for their own purpose. They may lookup data in the database or export the dataset or integrate the UN/LOCODE API in their own system.

2.4 UN/LOCODE Maintenance

The UN/LOCODE maintenance is the core business supported by this system. The maintenance is undertaken through the Data Maintenance Request (DMR).

2.4.1 Maintenance procedures

Actors related to DMR activities include **DMR Submitter**, **Focal Point**, **Expert** and **Secretariat**.

A DMR is submitted by a **DMR Submitter**. The DMR is then validated by a **Focal Point** if the requested DMR concerns a country which has nominated a National Focal Point.

The **Focal Point** may edit the DMR, reject the DMR, suspend further processing or recommend the approval of the DMR by the UN/LOCODE Maintenance Team. Focal Points may add additional information to a DMR, such as comments, correspondences with the submitter and other text files or images.

According to the Rec. 16, the Maintenance Team is responsible for validation of DMRs. The **Expert** in the Maintenance Team may validate DMRs Which are supposed to be processed by the team based on the workflow configuration. For example, the deadline for the **Focal Point** to review the DMR can be set up in the workflow configuration. If the DMR is not reviewed by the National Focal Point after the deadline, the **Expert** in the Maintenance Team will process it. The team may edit the DMR, reject the DMR, suspend further processing or approve the DMR for the publication. The team may add additional information, such as comments, correspondences with the **DMR Submitter** and/or the **Focal Point** and other text files or images.

The validation result of the Maintenance Team is recorded in the system by the **Secretariat**.

2.4.2 DMR Category

The DMR can be divided into three types with the following codes:

- NEW: DMR for a new UN/LOCODE entry
- MOD: DMR for modifying an existing UN/LOCODE entry
- DEL: DMR for deleting an existing UN/LOCODE entry

Deletion is a soft deletion. Upon approval for deletion, the UN/LOCODE entry in question is only marked with 'X' in the current published directory for information of the business community and it will be removed from the databased in the next directory release.

According to the Rec. 16, in principle the five-character UN/LOCODE of an existing entry should NOT be changed.

2.4.3 DMR Status

A DMR life cycle performs the following status (See Table 2).

Status/Activity	Description
DRAFTED	The DMR Submitter has drafted a DMR. The draft DMR has not yet been submitted to be validated.
CANCELED	The DMR Submitter has withdrawn the DMR before the submission.
SUBMITTED	The DMR Submitter has submitted the DMR for approval. DMR is registered with a unique number. The submitter can NOT update or delete the DMR after submission.
FP_REVIEW	An activity in which the DMR is reviewed by a Focal Point. The outcome can be one of the following three options <ul style="list-style-type: none">• FP_APPROVED• REJECTED• Further processing is suspended until an external event takes place, for example further information from the DMR Submitter is received. The status will be remained as FP_REVIEW.
FP_APPROVED	The DMR is approved by the Focal Point.
MT_REVIEW	An activity in which the DMR is processed by the Maintenance Team. The outcome can be one of the following three options: <ul style="list-style-type: none">• APPROVED• REJECTED• Further processing is suspended until an external event takes place, for example further information from the DMR

	Submitter is received. The status will be remained as MT_REVIEW.
APPROVED	The DMR has been approved ready for publication. This is a final decision.
REJECTED	The DMR has been rejected. This is a final decision.
PUBLISHED	The DMR has been published in a UN/LOCODE directory.

Table 2 - DMR life cycle

2.4.4 DMR Validation

We distinguish the following activities related to DMR, associated with actors and changes of status, as shown in Table 3.

Actor	Task	DMR status
DMR Submitter	Person or institution submitting a DMR	DRAFTED-> SUBMITTED
Focal Point	A body with the authority to review DRMs for a specified country or region; A National Focal Point may review more than one country code. The Focal Point performs the activity FP_REVIEW. In some countries this is a Competent Authority, nominated by the Government, in other countries this may be an expert or a group of experts. Focal Points can edit SUBMITTED DMRs.	SUBMITTED -> FP_APPROVED / REJECTED
Expert	Experts perform the activity MT_REVIEW. Normally, it has the final decision about all DMRs. If there is a justification, it could be revisited by the Maintenance Team before being published in the directory.	SUBMITTED / FP_APPROVED -> MT_REVIEW
Secretariat	The validation result is recorded by Secretariat.	MT_REVIEW -> APPROVED / REJECTED

Table 3 - Roles in DMR validation process

2.4.5 DMR Validation Rules

Certain rules need to be safeguarded to control consistency of data maintenance. These rules apply at all stages ranging from DMR submission to validation:

- Input validation must be run to ensure that inputs to DMR are in a good quality.
 - country name: based on ISO 3166-1

Note: Upon choosing of the country name, the corresponding 2-alphabetic country code in line with ISO 3166-1, will be fixed as the first 2-character of UN/LOCODE.

- Location code (last three-character of UN/LOCODE): 26 alphabets (not case sensitive) and number 2-9.

Note: number 1 and 0 can NOT be used.

- Location name: only characters adopted in the Rec. 16.
 - Subdivision: based on ISO 3166-2.
 - Functions: 1-character code from 1 to 8 plus A and B, as specified in the Rec. 16.
 - Coordinates: in a format agreed in the workflow configuration
- Upon submission, the consistency check must be run against existing UN/LOCODE entries and already SUBMITTED DMRs in the database.
 - For NEW DMRs, the system needs to ensure that
 - ✓ the requested entry is not duplicated for the same location, which is already assigned with UN/LOCODE; and
 - ✓ the proposed UN/LOCODE is free, which is not yet assigned to any locations.
 - ✓ this DMR is not duplicated with already SUBMITTED DMRs
 - For MOD DMRs, the system needs to ensure that
 - ✓ this UN/LOCODE entry requested to be changed exists in the database; and
 - ✓ this DMR is not duplicated with already SUBMITTED DMRs, and
 - ✓ except UN/LOCODE, at least one of fields published in the UN/LOCODE directory is changed.
 - FOR DEL DMRs, the system must endure that
 - ✓ this UN/LOCODE entry exists; and
 - ✓ this UN/LOCODE entry is not marked with the deletion sign 'x', which means that this entry is going to be removed from the database when the next publication is released; and
 - ✓ this DMR is not duplicated with already SUBMITTED DMRs
- If the DMR is submitted, the DMR Submitter cannot modify the DMR anymore.
- When the DMR is published, this DMR is NOT allowed to be modified by anyone any more.
- DMR submitter can track his or her own DMR's status any time.

2.4.6 DMR Life Cycle Diagram

The following diagram illustrates the whole DMR life cycle in the system, as shown in Figure 2.

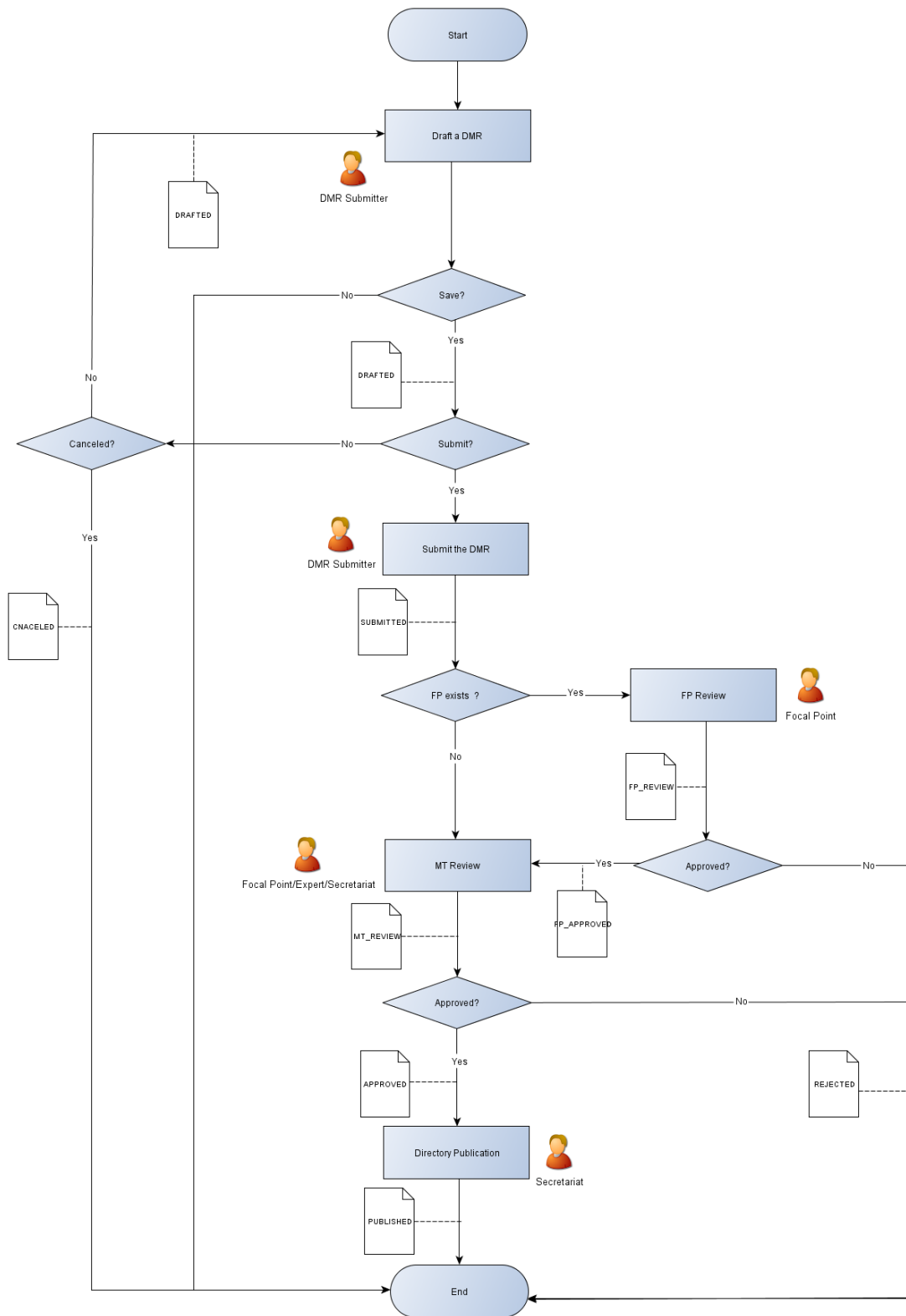


Figure 2 - DMR Life Cycle Diagram

3. Use Cases

3.1 Description of use cases

Use cases describe the workflow, the participation roles, the logical relationship between activities and the outcome of activities.

In this document, the use cases are described by the following aspects:

(Note: * means a mandatory aspect to be included in each use case.)

- **Use case title***

The name of the use case.

- **Active roles***

These are the roles that participate in the use case. The roles of this system are defined in Section 2.3.

- **Preconditions**

These are the conditions that must be satisfied for the use case to start. These preconditions may be other use cases, the compliance of participating data, the status of basic functional components (including authorization of commercial software), and the support of external data.

- **Activities and associated documentary requirements**

It is the heart of the use case. It describes all the activities in the use case under different conditions and the associated documentary requirements.

- **Exit criteria of the business process**

The criteria that all the activities in the use case will end when being met.

- **Error conditions**

It describes what happens if an error arises.

- **Participating use cases**

The description of the dependency between this use case and other use cases, including which use cases are provided with preconditions and which use cases should be supported.

- **Use case diagram***

The description of the use case is in a graphical way, including active roles, activities and rule constraints.

3.2 Category of use cases

The use cases in this system are mainly divided into two categories: Business use case and administrative use case. The business use cases are used to describe UN/LOCODE entries and Data Maintenance Request (DMR) related activities. The administrative use cases are used to describe the administrative issues of the system itself to support system functioning.

3.3 Overview of use cases

In this document, there are four business use cases and six administrative use cases, as shown in Figure 3.

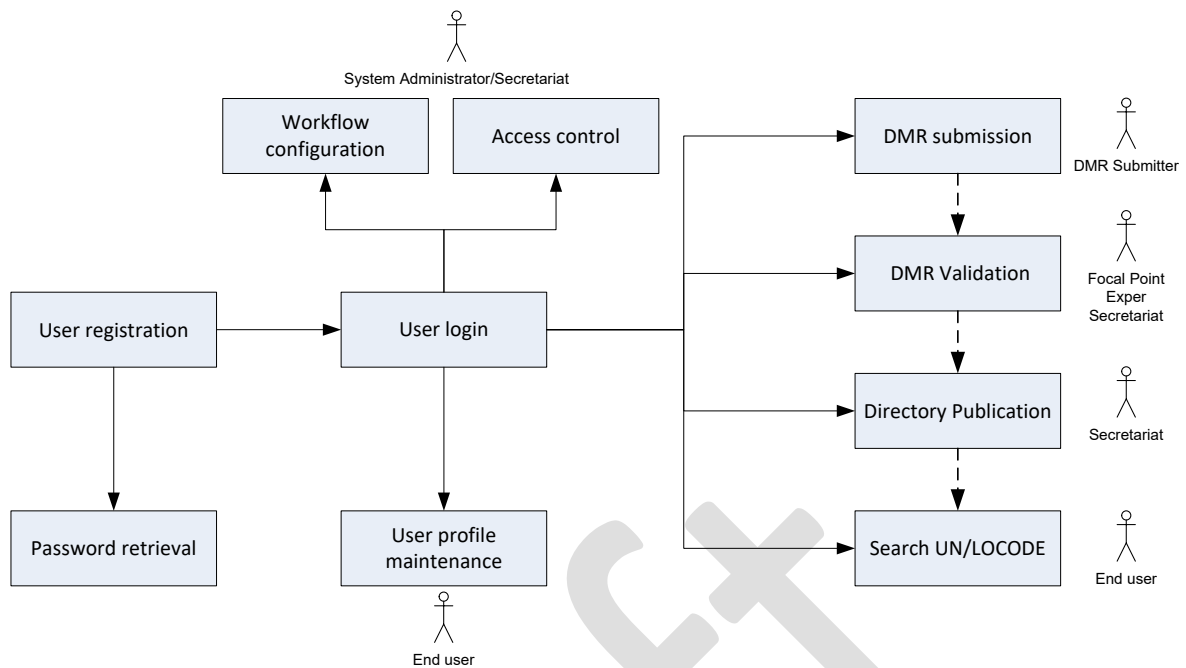


Figure 3 - Overview of use cases

All use cases are described in detail in Appendix E.

4. Interface Requirements

4.1 User Interface

The style of user interface in this system is represented, as shown in following figures, to showcase what the system looks.

Note: It is not the final template to be used for design, but a proof of concept.

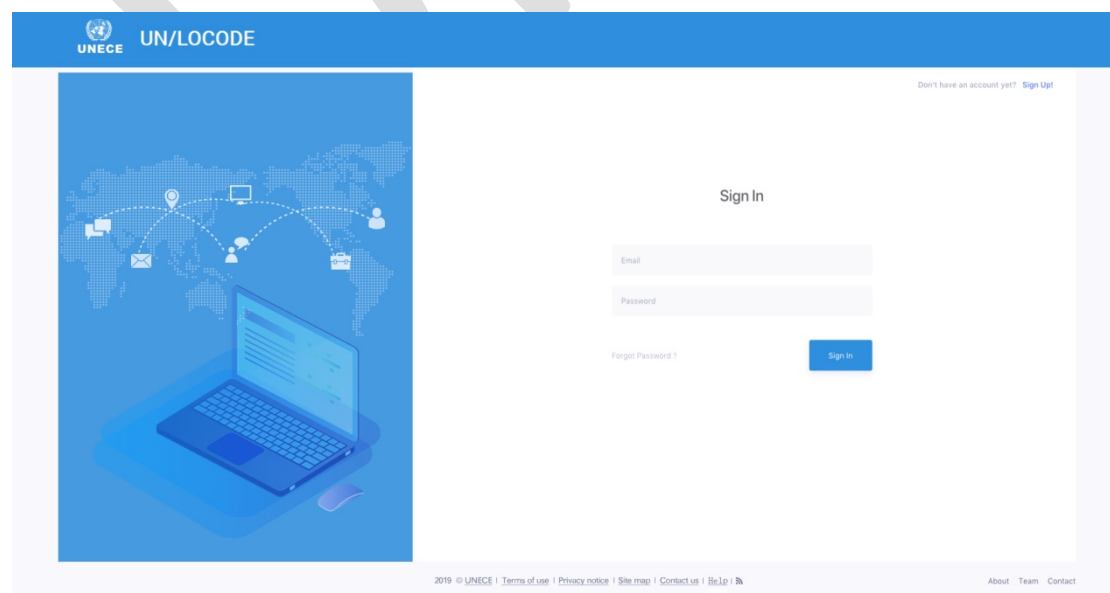


Figure 4 – Login page

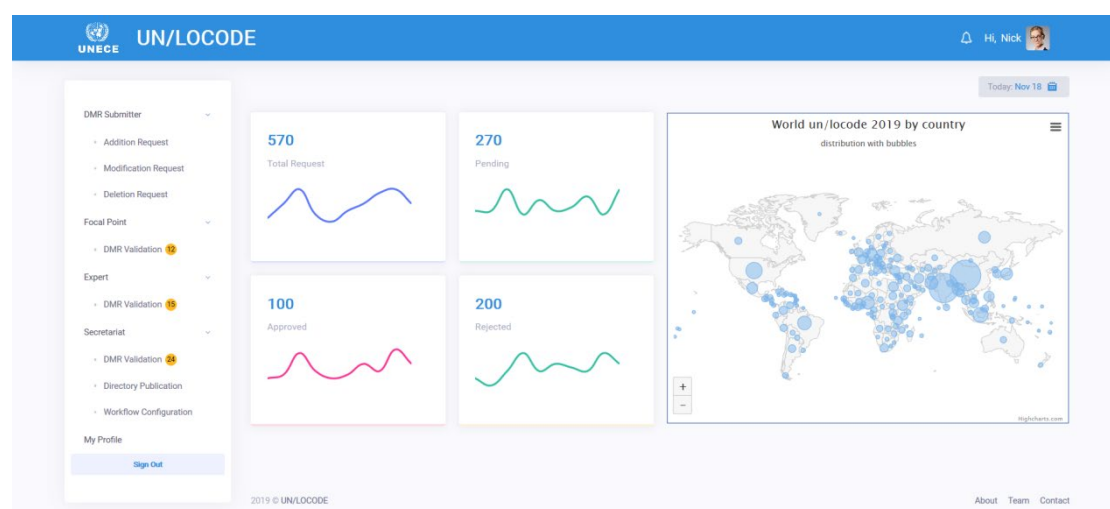


Figure 5 – Main page

Figure 6 – DMR submission page

4.2 APIs

Although analysis of APIs is out of scope of this document, it is very important for the key stakeholders. It will be conducted at the later stage with cooperation with the partners.

Appendix A: Project documentation naming convention and repository structure

A standard project repository structure and project naming convention help the project manager and project team to organize and share information efficiently. It facilitates:

- Project team communication
- Project management efficiency
- Project documentation management
- Configuration management of project deliverables
- Project orientation for new team members
- Reusability for future projects

Project naming convention includes a standard format for the name and unique identification of each project, standard identification for each project deliverable and version control attributes for both project management and software development (engineering) documentation.

For example: BusinessRequirementAnalysis_URP_05082019_v2.doc

BusinessRequirementAnalysis_URP_05082019_v2.doc

① ② ③ ④ ⑤

1. Document identification
2. Project abbreviation: URP standards for UN/LOCODE Re-engineering Project
3. Modified date: in ddmmYYYY format
4. Version number
5. Document type : e.g. Word Document

The project repository is structured with a reference Work Breakdown Structure (WBS), folder name, and associated project documents/deliverables (See Table A.1).

WBS ID	Folder / Sub-Folder Name	Documents
1	URP	▪ UN/LOCODE Re-engineering Project
1.1	Project Plan	▪ Business case ▪ ToRs including project schedule ▪ Workplan of BRA
1.2	Requirements	▪ Survey with stakeholders ▪ Business Requirement Analysis (BRA) report

WBS ID	Folder / Sub-Folder Name	Documents
		<ul style="list-style-type: none"> Use cases (included in BRA report as Appendix) Technical specification Systems diagram (included in BRA report as Appendix)
1.3	Design	<ul style="list-style-type: none"> High level design document Detailed design documents
1.4	Development	<ul style="list-style-type: none"> Code walkthrough
1.5	Testing	<ul style="list-style-type: none"> Test plan Defects tracking log Acceptance test Final test report
1.6	Documentation and Training	<ul style="list-style-type: none"> Training plan Documentation plan Standard documentation evaluation form
1.7	Deployment	<ul style="list-style-type: none"> System diagram Deployment strategy and plan Release readiness review Installation test Initial release final report Deliverables acceptance form Support interaction final report
1.8	Project Management	<ul style="list-style-type: none"> Project initiation document Management approaches Communication matrix Project closeout report Client satisfaction survey
1.81	Change Control	<ul style="list-style-type: none"> Request for change Change log
1.82	Contracts	<ul style="list-style-type: none"> Agreement MoU
1.83	Meetings & Memos (client, team, steering committee, etc.)	<ul style="list-style-type: none"> Agenda and notes
1.84	Project Logs	<ul style="list-style-type: none"> Risk and response log Lessons learned Issues log
1.85	Project Team	<ul style="list-style-type: none"> Team member evaluation Project organizational chart Project survey
1.86	Schedule	<ul style="list-style-type: none"> Project_schedule WBS Project timeline
1.87	SCM (Software Configuration Management)	<ul style="list-style-type: none"> SCM plan

WBS ID	Folder / Sub-Folder Name	Documents
1.88	Status Reports	<ul style="list-style-type: none">▪ Project status report▪ Team member status report▪ Executive status report▪ Quarterly operations review

Table A.1 – List of the folder name of the project documents

Draft

Appendix B: Analysis on the UNECE Recommendation 16

B.1 Structure

The revised UNECE Recommendation 16 is ready to be submitted to the next UN/CEFACT Plenary for approval in May 2020. In line with the format which is used for the other UNECE

Recommendations recently revised and published, it consists of the following parts:

- Part I: Recommendation No.16 Code for Trade and Transport Locations – UN/LOCODE
- Part II: Guidelines for the Application of UN/LOCODE
- Annex I: UN/LOCODE Maintenance Policy and Procedure Principles
- Annex II: Publication of Code List
- Annex III: Child Code List

B.2 Contents

B.2.1 Recommendation

In the Part I, following the background of UN/LOCODE, the purpose and the scope of this recommendation, and the benefits of using UN/LOCODE, the recommendation is introduced.

B.2.2 Guidelines

In the part II, the guidelines are provided for the application of UN/LOCODE, including the definition of UN/LOCODE, introduction of the National Focal Point, attributes of UN/LOCODE, the maintenance and Child Codes of UN/LOCODE.

B.2.3 Annexes

- Annex I: UN/LOCODE Maintenance Policy and Procedure

It specifies the UNLOCODE maintenance policy and procedure including the principles, DMR preparation, submission, and validation.

- Annex II: Publication of UN/LOCODE Directory

It specifies the UN/LOCODE Directory.

- Annex III: Child Code List

It introduces a repository for the UN/LOCODE Child Codes by sharing the registration form whose template is specified.

B.3 Issues related to system development

Compared with the last edition of Recommendation 16, the changes in this revised version of Recommendation 16 may affect the system development as follows:

1. In the revised version, because of the establishment of the UN/LOCODE Focal Point Network, the UN/LOCODE Advisory Group, and the UN/LOCODE Maintenance Team, these new terms are introduced, including their duties and responsibilities. Their importance is recognized for the maintenance and the development of UN/LOCODE. The new system will facilitate the FPs and the Maintenance Team to be involved in the maintenance workflow.
2. Five attributes of UN/LOCODE are clarified in the revised Recommendation to replace the use of seven columns in the current UN/LOCODE Directory, as shown in Table B.1.

Old version	Revised version		Comparisons
Columns in the Directory	Attributes	Data elements in the Directory	
Change Indicator (Ch)		Yes	In the revised version, UN/LOCODE (five-character code) is not part of five attributes.
UN/LOCODE code (LOCODE)		Yes	The concept of international trade is introduced.
Location Name	Attribute: Name	Yes	
NAME without diacritics (NameWoDiacritics)			
Subdivision (SubDiv)	Attribute: Subdivision	Yes	Still based on 3166-2.
Function	Attribute: Function	Yes	To be consistent with the UNECE Recommendation 19 (Code for Modes of Transport), retaining from Function '1' to Function '7' plus Function 'B', it adds Function '8' for the river or the inland water port and Function 'A' for the Special Economic Zone.
Status	Attribute: Status	Yes	The legacy status: 'AA', 'AC', 'AF', 'AI', 'AS', 'AQ' and 'RN', are replaced with 'AM', which means 'approved by the UN/LOCODE maintenance team'
Last Updated Date (Date)		Yes	
IATA			

Coordinates	Attribute: Geographical Coordinates	Yes	As an attribute, this data element is not optional any more.
Remarks		Yes	

Table B.1 - Comparisons between the old version and new version of recommendation 16

3. With the development of technology, there is no need to distribute the UN/LOCODE Directory by diskette, telefax and other transmissions, but publishing it on the UNECE website.
4. The Data Maintenance Request (DMR) should be submitted online.

Draft

Appendix C: Glossary

C.1 UNECE

The United Nations Economic Commission for Europe (UNECE) was set up in 1947 by [ECOSOC](#). It is one of five regional commissions of the United Nations.

UNECE's major aim is to promote pan-European economic integration. UNECE includes 56 member States in Europe, North America and Asia. However, all interested United Nations member States may participate in the work of UNECE. Over 70 international professional organizations and other non-governmental organizations take part in UNECE activities.

C.2 UN/CEFACT

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) is a subsidiary, intergovernmental body of the United Nations Economic Commission for Europe (UNECE) which serves as a focal point within the United Nations Economic and Social Council for trade facilitation recommendations and electronic business standards. It has global membership and its members are experts from intergovernmental organizations, individual countries' authorities and also from the business community.

C.3 UN/LOCODE

The United Nations Code for Trade and Transport Locations (UN/LOCODE) is a five-character code system that provides a coded representation to identify the locations for the international trade and transport.

Although managed and maintained by the UNECE, it is the product of a wide collaboration in the framework of the joint trade facilitation effort undertaken within the United Nations.

The UN/LOCODE Directory is updated twice a year and it currently contains over 100,000 location codes.

C.4 UNECE Recommendation No.16

Recommendation 16 recommends a five-letter alphabetic code for abbreviating names of locations for the international trade and transport, and whose names need to be represented unambiguously in data interchange.

C.5 UN/LOCODE Advisory Group

The UN/LOCODE Advisory Group was launched in 2017 in order to sustainably maintain and develop UN/LOCODE composing by key stakeholders, including main users from public and private sector, and UN/LOCODE Focal Points, on a volunteer basis.

C.6 UN/LOCODE Maintenance Team

According to the decision made by the UN/LOCODE Advisory Group, the UN/LOCODE maintenance team was set up in 2019, based on volunteers from the UN/LOCODE Advisory Group. The team is responsible for the validation of DMRs with the support of the secretariat, led by two co-conveners.

C.7 Data Maintenance Request (DMR)

Data Maintenance Request (DMR) is a term used for the UN/LOCODE maintenance. It is a request for a new UN/LOCODE entry, or for modification, or for deletion of an existing UN/LOCODE entry.

After being validated, if it is approved, it will be published in the directory.

C.8 UN/LOCODE Focal Point Network

The UN/LOCODE Focal Point Network is established by UNECE to improve the quality of UN/LOCODE, including the National Focal Point nominated by governments and the Institutional Focal Point nominated by international or regional organizations, such as IMO, ITU, IATA, UPU, EMSA.

C.9 UN/LOCODE National Focal Point

A National Focal Point is appointed by a national government to maintain its national list of UN/LOCODEs. The maintenance tasks include approving new codes and revising or updating existing codes in a specified geographic context. National Focal Points will also promote the use of UN/LOCODE and contribute to the further development of the standard.

Draft

Appendix D: System deployment

The UN/LOCODE system will be hosted by UNECE. For the system deployment, the network and the servers will be designed as shown in Figure D.1.

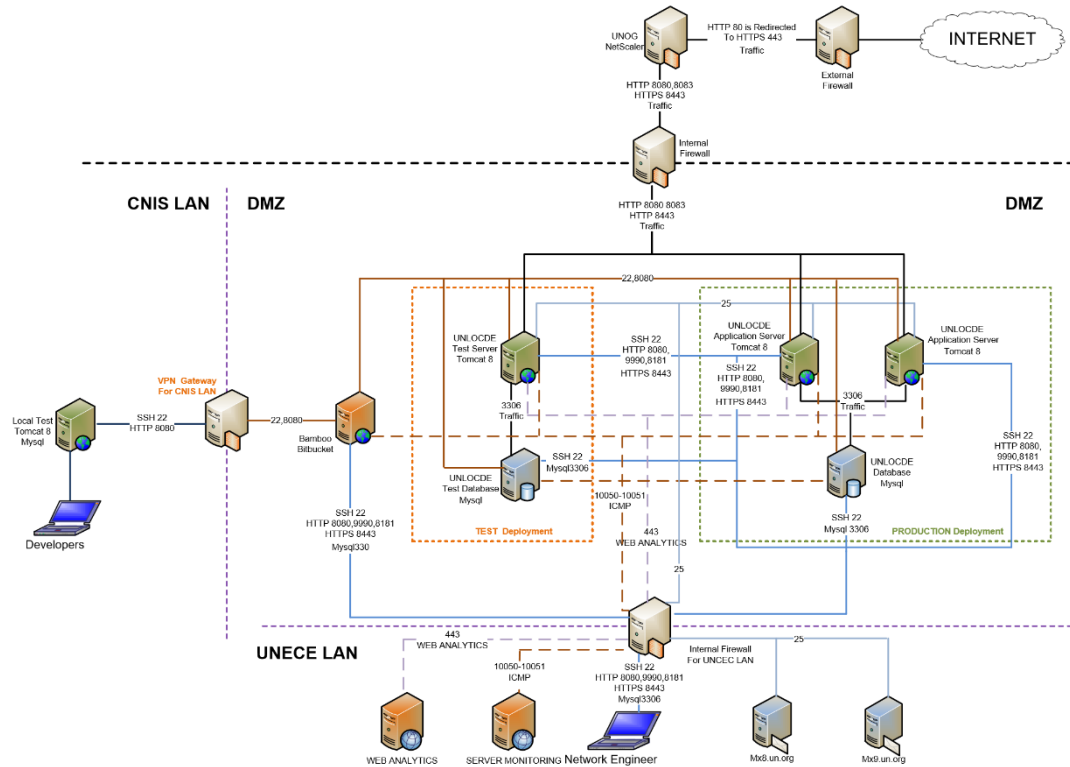


Figure D.1 - System deployment Diagram

- **DMZ**

In the middle, DMZ is a core part, including the Bamboo and Bitbucket server together with the application servers and database servers in both the TEST environment and the PRODUCTION environment. The PRODUCTION environment labelled with a green dot-line box will provide services to the UN/LOCODE business community. The TEST environment labelled with an orange dot-line box will support the final testing before the release of the new version of UN/LOCODE system. The TEST environment is used to simulate the PRODUCTION environment, i.e. the software, the hardware, and the network connection in the TEST environment are consistent with ones in the PRODUCTION environment.

- **CNIS-LAN**

On the left, CNIS-LAN hosts a development environment for local developers from CNIS to work. A local test server is deployed for developers to test their development. Upon the completion of the development, the developer will test it on the local test server. If the test result is satisfied, the update package will be transferred to the server in the TEST environment in DMZ for final testing. After finishing this testing, the developer will decide whether to deploy it to PRODUCTION environment.

- **UNECE-LAN**

On the bottom, UNECE-LAN hosts the web analysis and traffic monitoring servers. The WEB ANALYTICS server is deployed to analyze WEB services and generate analysis reports, and the MONITORING server is deployed to monitor traffic of web visits. The mirrored MAIL servers provide email service for the system.

CNIS-LAN and UNECE-LAN are working environments, which are connected to DMZ through internal firewalls.

- INTERNET

On the top, INTERNET part ensures Internet connection to the system.

Draft

Appendix E: List of use cases

E.1 List of business use cases

E.1.1 Use case 1: DMR Submission

DMR Submitter creates a DMR for a new UN/LOCODE entry, modification or deletion of an existing UN/LOCODE entry (as codified with NEW-DMR, MOD-DMR and DEL-DMR). The Submitter can then save, cancel, change or submit the DMR.

In addition to the data requested to be published in the UN/LOCODE directory, the Submitter is requested to provide the following additional information

- Web link: a hyperlink to a gazetteer to indicate the location
- Supporting documents: Possibility to attach text files, images etc. to support a DMR
- Remark to justify the DMR,

Only DMRs passing automatic quality control check (input and submission validation) can be submitted. Upon being submitted successfully, the valid DMR is registered with a unique serial number. It is ready to be processed for approval by the Maintenance Team. The description of this use case is shown in Table E.1.

Active roles	DMR submitter
Preconditions	Only registered users can submit a DMR after login with their credentials.
Activities and associated documentary requirements	<p><i>Create a DMR</i></p> <p>The DMR Submitter decides which type of DMR will be submitted: NEW-DMR (Request for a new UN/LOCODE), MOD-DMR (Request for the modification of an existing UN/LOCODE) or DEL-DMR (Request for the deletion of an existing UN/LOCODE) and then provides the following data in a requested way.</p> <ul style="list-style-type: none">▪ NEW-DMR:<ul style="list-style-type: none">• Country code* (2-character)• Location code* (3-character)• Location name*• Subdivision• Functions*• Geographical coordinates*• Web link*• Justification▪ MOD-DMR:<ul style="list-style-type: none">• Country code* (2-character): submitter cannot change this field• Location code* (3-character): submitter cannot change this field• Location name*• Subdivision

	<ul style="list-style-type: none"> • Functions* • Geographical coordinates* • Web link* • Justification for the changes* ▪ DEL-DMR: <ul style="list-style-type: none"> • Country code*(2-character): submitter cannot change this field • Location code* (3-character): submitter cannot change this field • Justification for the deletion* <p>In case of NEW-DMR and DEL-DMR, the DMR Submitter enters the UN/LOCODE and the system will populate the data of the UN/LOCODE entry on the screen. In case of a MOD-DMR, the system will keep track about which fields have been changed.</p> <p><i>Save the draft DMR</i></p> <ul style="list-style-type: none"> • The DMR Submitter saves the draft DMR. • The status of the DMR changes to DRAFTED <p><i>Cancel the draft DMR</i></p> <ul style="list-style-type: none"> • The DMR Submitter cancels the draft DMR • The entry of the draft DMR is removed from the DMR table. <p><i>Change the draft DMR</i></p> <ul style="list-style-type: none"> • The DMR Submitter opens a draft DMR • The DMR Submitter edits the opened draft DMR <p><i>Submit the DMR</i></p> <ul style="list-style-type: none"> • The DMR Submitter submits the DMR for approval • The system runs the DMR <i>validation rules</i> • The system assigns a change indicator to the DMR: '+' to NEW; '#' to MOD which requests for changing a location name with/without other changes on attributes; ' ' to MOD which requests for changes on other attributes than location name; 'X' to DEL • The system returns a unique DMR registration number • The status of the DMR changes to SUBMITTED
Exit criteria of the business process	The status of the DMR changes to SUBMITTED
Variations of the business process and issues	Some submitters may need to submit large numbers of DMRs. There is a need to upload DMRs from an external interface (i.e. spreadsheet) and to submit many DMRs at one time
Error conditions	Not passing input and submission validation.
Participating use cases	User Login

Table E.1 Use case 1: DMR Submission

Use case diagram

The diagram of Use Case 1: DMR Submission is shown in Figure E.1.

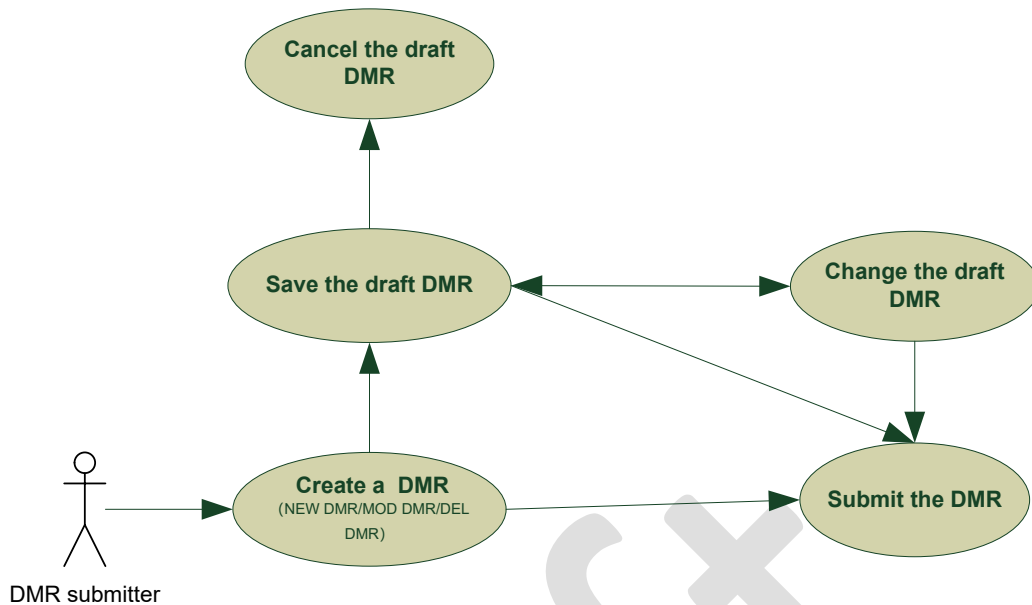


Figure E.1 – Diagram of Use Case 1: DMR Submission

E.1.2 Use Case 2: DMR Validation

If the submitted DMR concerns the country for which a Focal Point is nominated, the DMR is routed to this Focal Point and the Focal Point will review the DMR. According to the workflow configuration, the DMRs which Focal Points don't review will be routed and processed by Experts in the Maintenance Team and then the secretariat will record the decision of the team as the final validation result. The description of this use case is shown in Table E.2.

Active roles	Focal Point, Expert, Secretariat
Preconditions	Only authorised actors after login with their credentials and the DMR is successfully submitted.
Activities and associated documentary requirements	<p><i>Focal Point Review</i></p> <p>For the DMR concerning his or her county to be validated if:</p> <p>NEW-DMR:</p> <ul style="list-style-type: none"> • The attributes are geographically correct, including location name, subdivision, coordinates ... • It is relevant to the international trade, especially function(s) <p>MOD-DMR:</p> <ul style="list-style-type: none"> • Modification(s) on attributes be correct. <p>DEL-DMR:</p> <ul style="list-style-type: none"> • Justification is acceptable • Add remarks if necessary. For example, if a duplication is accepted to ne remove, indicate

	<p>which UN/LOCODE should be used for the same location.</p> <p><i>Maintenance Team Review</i></p> <ul style="list-style-type: none"> DMRs should be processed by the team based on the workflow configuration Raised by the Focal Point for discussion by the team <p><i>Secretariat records the validation result</i></p> <ul style="list-style-type: none"> If the DMR is approved, the attribute 'Status' to be assigned with "AM", the status is set as APPROVED If the DMR is rejected, the status will be set as REJECTED and the justification will be recorded.
Exit criteria of the business process	The status of the DMR changes to APPROVED or REJECTED
Variations of the business process and issues	DMR approved by Focal Point needs the team review or not.
Error conditions	None
Participating use cases	User Login; DMR Submission

Table E.2 - Use Case 2: DMR Validation

Use case diagram

The diagram of Use Case 2: DMR Validation is shown in Figure E.2.

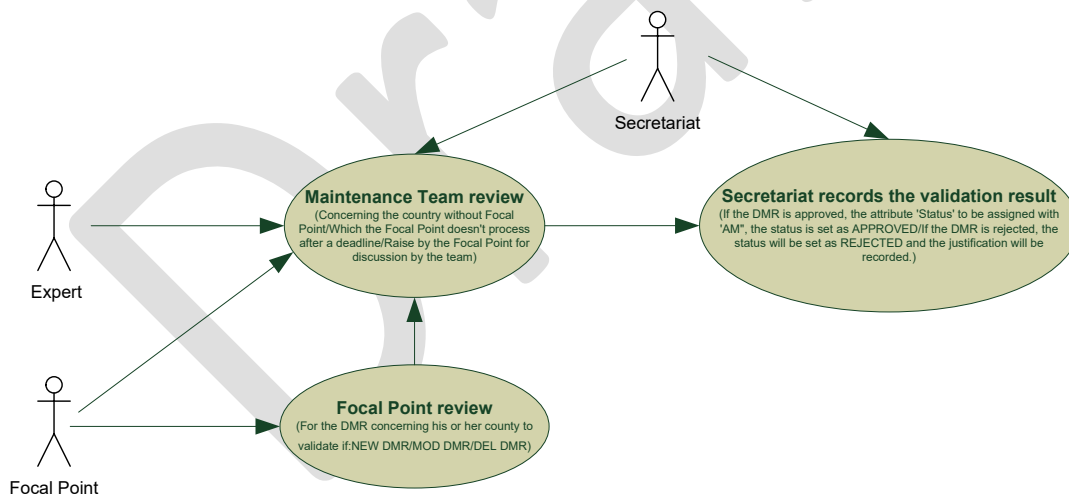


Figure E.2 – Diagram of Use Case 2: DMR Validation

E.1.3 Use Case 3: Directory Publication

All DMRs with the status 'APPROVED' and meeting the criteria set up in the workflow configuration, should be published in the next UN/LOCODE release, which is published bi-annually. The system generates an HTML page per country and full data set in formats of ACCESS DB, EXCEL and TXT and provides statistics of approved DMRs, including the numbers of how many additions, modifications and deletions, to be included in the Secretariat Note, which is published together with each release. The description of this use case is shown in Table E.3.

Active roles	Secretariat
Preconditions	Only authorised actors after login with their credentials; the DMR has been submitted before the cut-off date and approved.
Activities and associated documentary requirements	<p><i>Directory Generation</i></p> <ul style="list-style-type: none"> Based on the updated database, the DMRs which are approved and meet the inclusion criteria of directory publication in the workflow configuration are appended in the new directory. Generating the new directory including the following fields: <ul style="list-style-type: none"> Change Indicator Country code (2-character) Location code (3-character) Location name Subdivision Functions Geographical coordinates Remarks <p><i>Change Indicator is specified in the Rec. 16: '+' for a new entry, '1' for changes on attributes, except location name, '#' for changes on location name with/without changes on attributes; 'X' for an entry to be removed.</i></p> <p><i>Directory Publishing:</i></p> <ul style="list-style-type: none"> Generating a webpage of directory per country Exporting the directory in three Formats: ACCESS DB, EXCEL and TEXT. Generating statistics of DMRs to help to compile the Secretariat Note. <p><i>Publishing to the UNECE website</i></p>
Exit criteria of the business process	The status of the DMR changes to PUBLISHED.
Variations of the business process and issues	None.
Error conditions	None.
Participating use cases	User login, DMR Validation

Table E.3 - Use Case 3: Directory Publication

Use case diagram

The diagram of Use Case 3: Directory publishing is shown in Figure E.3.

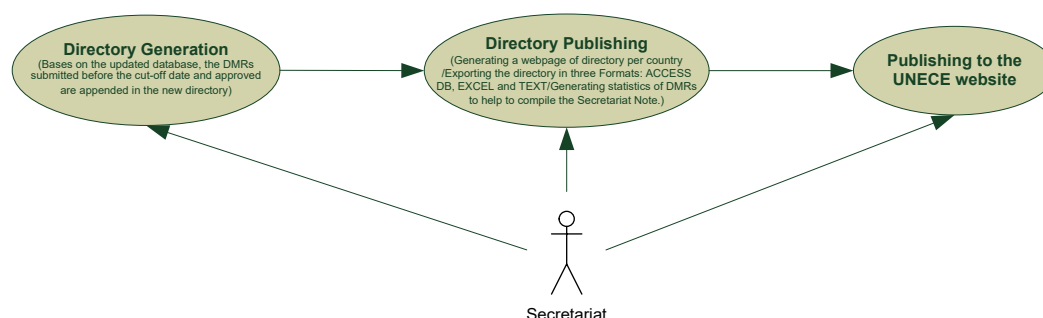


Figure E.3 – Diagram of Use Case 3: Directory Publication

E.1.4 Use Case 4: Search UN/LOCODE

End user looks up the database with search criteria and the system returns the search result. The description of this use case is shown in Table E.4.

Active roles	End user
Preconditions	Only authorised actors after login with their credentials
Activities and associated documentary requirements	The End user searches the database with search criteria and the system returns the search result.
Exit criteria of the business process	The status of the DMR changes to PUBLISHED.
Variations of the business process and issues	The End user might search country code or subdivisions of a country.
Error conditions	None
Participating use cases	User login

Table E.4 - Use Case 4: Search UN/LOCODE

Use case diagram

The diagram of Use Case 4: Search UN/LOCODE is shown in Figure E.4.



Figure E.4 – Diagram of Use Case 4: Search UN/LOCODE

E.2 List of administrative use cases

E.2.1 Use Case 5: User Registration

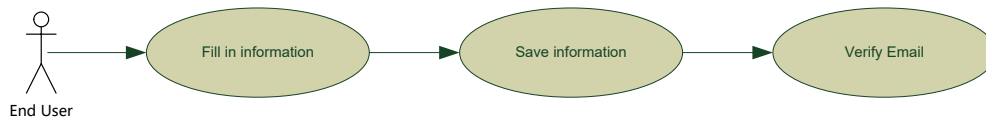
The system is open for the authorized users and thus it requires the users to log in before using it. In order to be able to log in, users need to complete the registration. This use case describes the process of user registration, which requires the End user to fill in the necessary user information as requested, pass input verification, and then submit. Finally, the system returns the processing result to notify if the End user registers successfully. The description of this use case is shown in Table E.5.

Active roles	End user
Preconditions	Everyone can register an account in the system free of charge.
Activities and associated documentary requirements	<p><i>User Registration:</i></p> <p>The End user should fill in and submit the user information through this activity when he/she visits this system for the first time. The system checks the filled information, which includes the following fields:</p> <ul style="list-style-type: none">• Requestors company/organization name*• Contact person name*• Address• Phone number• User ID (email address) *• Password * <p>Note: The fields labelled with * are mandatory. User's email address will be used as the user ID, which should be unique in the system. Password policy:</p> <ul style="list-style-type: none">• At least 8-character and maximum 16-character;• At least including one letter in low-case and one letter in upper case <p>User ID (<i>email address</i>) authenticity verification: The user ID (email address) is used for the system to identify the End user and notify the message to the End user. The system must verify the authenticity of the email address. Upon the submission of the user registration, the system will generate a unique URL valid within a period of time and associate with the users registration information, and then automatically send it to the users registered mailbox . Upon receiving the email, the End user clicks the URL to verify it. After a successful registration, the End user can retrieve the password through the mailbox in case of forgetting the password.</p>
Exit criteria of the business process	The user registration is successful, and the user ID (email address) is verified.
Variations of the business process and issues	Whether the End users registration information should be reviewed and approved manually.

Error conditions	The user ID (email address) already exists or does not pass authenticity verification.
Participating use cases	None

Table E.5 - Use Case 5: User Registration**Use case diagram**

The diagram of Use Case 5: User Registration is shown in Figure E.5.

**Figure E.5 – Diagram of use case 5: User Registration****E.2.2 Use case 6: User Login**

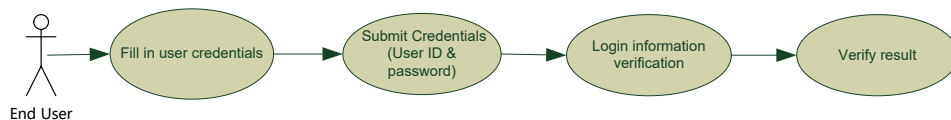
The system requires the user to log in order to provide services to the authorized users. After the user logs in, the system judges what corresponding system functionality is authorized to be assigned to this user according to the access control rules. The description of this use case is shown in Table E.6.

Active roles	All
Preconditions	The user registration is successful, and the authenticity verification of the user name (email address) is completed.
Activities and associated documentary requirements	<p><i>User login:</i> The user submits the credentials including:</p> <ul style="list-style-type: none"> • User ID (email address) * • Password * • Verification code* <p>Verification code is a set of characters generated randomly by the system, which is displayed by a picture. When the user submits the login information, he/she fills in this set of characters to verify whether the identity of the login is a real person.</p> <p><i>User login verification result returns:</i> After the user submits the login information, the system will return the verification result. If the verification is passed, the user will enter the system and view the corresponding user interface based on the users role (s).</p>

Exit criteria of the business process	User login information is verified
Variations of the business process and issues	None
Error conditions	User information verification fails: <ul style="list-style-type: none"> the user ID entered does not exist; the user's password typed is incorrect; the verification code input is incorrect, and the user is set as disabled by the system administrator
Participating use cases	User Registration

Table E.6 - Configuration of Use Case 6: User Login**Use case diagram**

The diagram of Use Case 6: User Login is shown in Figure E.6.

**Figure E.6 – Diagram of Use Case 6: User Login****E.2.3 Use Case 7: User Profile Maintenance**

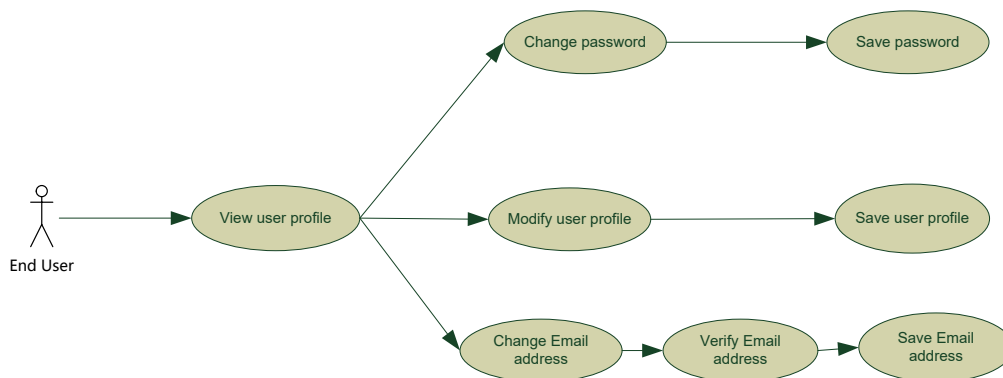
The User can update their personal information. The description of this use case is shown in Table E.7.

Active roles	End user
Preconditions	User Login is successful.
Activities and associated documentary requirements	<p><i>View personal information:</i> The user can view their personal information registered or latest updated in the system.</p> <p><i>Update personal information (except Password):</i> After reviewing the personal information, if necessary, the user will modify it. The modified items don't include password. In addition, if the user wants to modify user ID (email address), the system will verify the email address.</p> <p><i>Save the personal information (except Password):</i> After the user modifies the personal information and decides to update it, the updated information will be submitted to the</p>

	<p>system, and the system will save it after the necessary input verification.</p> <p><i>Change Password:</i> After the user logs in, the password can be changed. In order to ensure the security, the system will require to re-enter the original password before changing it. The new password should comply with the security policy that password should be considering of 8-16 characters, combined with letters and numbers. After the verification, the system will change the password successful and redirect the user to the login interface to log in with the new password.</p>
Exit criteria of the business process	The users personal information has been updated and saved successfully, or the password has been changed successfully.
Variations of the business process and issues	None
Error conditions	The typed information doesn't pass input verification, or when the password is changed, the original password is incorrect, or the new password doesn't meet the policy to meet security requirements.
Participating use cases	User Login

Table E.7 - Configuration of Use Case 7: User Profile Maintenance**Use case diagram**

The diagram of Use Case 7: User Profile Maintenance is shown in Figure E.7.

**Figure E.7 – Diagram of Use Case 7: User Profile Maintenance****E.2.4 Use Case 8: Password Retrieval**

The user may forget the password and it results in the failure of logging in to the system. The system needs to make it feasible to 'retrieve' or reset password. In order to prevent the leakage of the user's password, the system makes it unreadable with encrypting it in the system. Because this encryption is not irreversible, the original password is not able to be retrieved. Therefore, when the user tries to retrieve the password, it is not to really retrieve the original password, but to let the user reset a new password after the identification of the user. The identification is done by sending an

email with verification link to the registered user's email address. After the user receives it in the mailbox, the user clicks the link to authenticate his/her identity, and then resets a new password. The description of this use case is shown in Table E.8.

Active roles	End user
Preconditions	The User has already registered successfully and can remember correctly his or her own user ID (email address).
Activities and associated documentary requirements	<p><i>Request for password retrieval:</i> The user submits a request for the password retrieval to the system with the User ID (email address).</p> <p><i>Identity verification:</i> The system receives the password retrieval request submitted by the user and sends an email with a verification link to the users email address. After receiving the email, the user clicks the link to complete the authentication.</p> <p><i>New password settings:</i> After the authentication, the user fills in a new password twice. If the two entered passwords are identical, the user can submit the new password to save it in the system. This password should comply with the security policy that Password should consist of 8-16 characters, combined with letters and numbers. After the system is verified, the recorded password is changed to a new password.</p>
Exit criteria of the business process	User authentication is succeeded, and the new password is saved successfully.
Variations of the business process and issues	None
Error conditions	User forgot user ID (email address)
Participating use cases	User Registration

Table E.8 - Configuration of Use Case 8: Password Retrieval

Use case diagram

The diagram of Use Case 8: Password Retrieval is shown in Figure E.8.



Figure E.8 – Diagram of Use Case 8: Password Retrieval

E.2.5 Use Case 9: Access Control

The user is permitted to perform different use cases according to the user's role(s). System Administrator and Secretariat can assign the role of the user. A user can have multiple roles each of which is assigned with a permission to use different functions provided by the system. System Administrator and Secretariat can determine which function should be used by which role(s). The description of this use case is shown in Table E.9.

Active roles	System Administrator
Preconditions	Successful User login
Activities and associated documentary requirements	<p><i>Rights assigned to a Role:</i> System Administrator or Secretariat sets up access rights for each Role in the system by selecting in the list.</p> <p><i>Role(s) assigned to the user:</i> System Administrator or Secretariat assigns the user with Role(s) in the list.</p>
Exit criteria of the business process	Settings is saved successfully.
Variations of the business process and issues	None
Error conditions	None
Participating use cases	User Login

Table E.9 - Configuration of Use Case 9: Access Control

Use case diagram

The diagram of Use Case 9: Access Control is shown in Figure E.9.

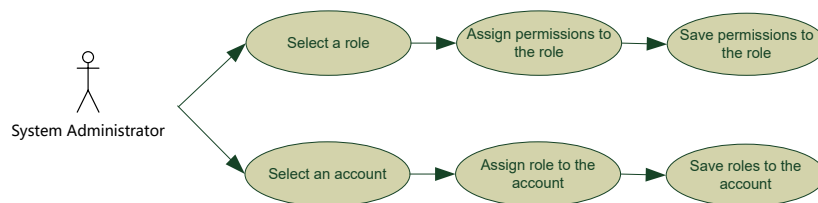


Figure E.9 – Diagram of Use Case 9: Access Control

E.2.6 Use Case 10: Workflow Configuration

The UN/LOCODE maintenance workflow is submit to changes caused by decisions made by the UN/LOCODE Advisory Group. When the secretariat carries out the new workflow, it will need the system to support flexibility of workflow configuration. After the configuration, the new workflow can be supported automatically without re-developing the system. The description of this use case is shown in Table E.10.

Active roles	Secretariat
Preconditions	The decision is made by the UN/LOCODE Advisory Group, which triggers changes.
Activities and associated documentary requirements	<p><i>Set up rules and parameters:</i> The Secretariat set up rules for the maintenance to indicate</p> <ul style="list-style-type: none"> • if locations' Functions need to be verified before the DMR is validated, for example, Function 1 by IMO, Function 4 by IATO and/or ICAO, Function 5 by UPU; • Which DMRs should be processed by the Maintenance Team: For example, the DMR is not processed by the FP after a given headline; • If a special workflow is set up for a given country, for example, the country needs the DMR Submitter to consult with the FP before the submission. The country only authorizes the FP to submit DMRs; • Who is authorized to submit DMRs by batch; and • If the DMR submitted before the cut-off date and approved will be published in the Directory. <p><i>Generates the workflow:</i> The system generates the workflow based on the workflow configuration.</p>
Exit criteria of the business process	The workflow is generated successfully.
Variations of the business process and issues	None
Error conditions	None
Participating use cases	User Login

Table E.10 - Configuration of Use Case 10: Workflow Configuration

Use case diagram

The diagram of Use Case 10: Workflow Configuration is shown in Figure E.10.



Figure E.10 – Diagram of Use Case 10: Workflow Configuration