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UN/LOCODE strategy

Report of UN/LOCODE Task Force

Summary

The secretariat prepared a Terms of Reference (ToRs) for the UN/LOCODE Task Force in response to the decision made by the UN/LOCODE Advisory Group at its 2023 meeting to establish a single task force, led by the Vice Chair and supported by the secretariat, to systematically address these challenges raised recently during the UN/LOCODE maintenance proceedings (Decision 23-16).

Following the meeting, the Task Force established four subgroups to address different key issues. The leader of each subgroup reported on its progress; the Vice Chair consolidated the inputs, and the secretariat finalized this report.

The secretariat submits this document to the 2024 meeting of the UN/LOCODE Advisory Group for information.

I. Introduction

1. Throughout the UN/LOCODE maintenance meetings, a myriad of intricate topics emerge, encompassing issues that affect countries, ports, and special zones. These discussions often involve complex situations, necessitating deliberations aimed at achieving consensus on these matters.

2. The purpose of the UN/LOCODE maintenance meetings is to validate the Data Maintenance Request (DMR), not to address the maintenance policy issues.

3. In response to the decision made by the UN/LOCODE Advisory Group at its 2023 meeting to establish a single task force, the secretariat prepared the Terms of Reference for this task force and organized a kick-off meeting on 28 September 2024 to set up the UN/LOCODE Task Force.

4. The objective of the Task Force is to assist the UN/LOCODE Advisory Group in addressing the issues raised and discussed during the 2023 Meeting of the UN/LOCODE Advisory Group and to report its findings and recommendations at the 2024 Meeting.

5. During the 2023 Meeting of the UN/LOCODE Advisory Group, many issues were raised. However, due to the impossibility of addressing all of them, a process of identifying the most impactful ones was undertaken, resulting in the selection of four main subjects.

II. Scope

6. The Task Force established four Subgroups:

- Subgroup 1: Identification of small fishery ports in the Food and Agriculture Organization (FAO) Global Record.
- Subgroup 2: Feasibility study to fast-track UN/LOCODE as an ISO standard.
- Subgroup 3: Address the co-existence of UN/LOCODEs assigned to locations (areas) and sub-locations (points).
- Subgroup 4: Testing of the new re-engineered online DMR application.

III. Organizing and coordination

7. The Task Force will focus on research and analysis activities, including providing a forum for discussion, information sharing and drafting the report to submit to the Advisory Group for decision.

8. The Task Force is open to any interested members of the Advisory Group for participation voluntarily.

9. Selected experts, representatives of related international organizations, and other entities may participate upon invitation.

10. Each subgroup is led by an expert on the matter raised.

11. The Kick-off meeting was held on 28 September 2023 moderated by the Vice-Chair of the Advisory Group. During this meeting, a brief presentation covered each of the four subgroups[1]:

- Presentation by Mr. Guiliano Carrara (FAO) on the FAO Global record.
- Presentation by Mr. Yu Shi (Chair of ISO TC/154) on the relevant ISO standards.
- Presentation by Mr. Wenfeng Sun (CNIS) on potential UN/LOCODE solution for sublocations.

[1] See https://unece.org/trade/events/unlocode-task-force-kick-meeting

- Presentation by Mr. Kevin Bishop (UNECE) of the front end to be re-engineered.

12. At the end of the kick-off meeting, a call for experts was made to invite interested individuals to join each subgroup. These experts registered via the web-based form provided by the secretariat to express their interest voluntarily. Consequently, the secretariat compiled a final list of volunteer experts and organized various meetings, including working sessions for subgroups and coordination meetings between the Vice-Chair and the subgroup leaders.

13. Due to capacity and certain inconveniences, only Subgroup 3 and Subgroup 4 have made progress and submitted their report.

IV. Report from Subgroup 3 (Annex. 1)

14. The issues to be addressed:

- Clean-up of co-existence of UN/LOCODEs assigned to locations (areas) with legacy UN/LOCODEs assigned to sub-locations (points).
- Presentation and outcomes from the meetings conducted.

V. Report from Subgroup 4 (Annex. 2)

15. Testing of the new web-based online Data Maintenance Request system.

- Presentation and outcomes from the meetings conducted.
- The passing of the OICT Cyber Security Audit.

VI. Way-forward

16. After the reports from Subgroup 3 and Subgroup 4 are presented at the 2024 Meeting of the UN/LOCODE Advisory Group, the Group should discuss the forward-forward such as:

- Should we keep moving forward with the matters raised by the subgroups mentioned above?
- Do we need extra help to move forward with the project of each subgroup?
- Do we have enough resources?
- Should we create a new subgroup for the project proposed by the secretariat for fundraising?
- Do we have the capacity and resources to resume subgroups 1 and 2, created at the beginning of the Task Force initiative?
- Should we have a strong follow-up, for instance, creating a scheduled calendar meeting?
- Should we have a deadline to present the final white paper?

Annex.1 Report of Subgroup 3

Address the co-existence of UN/LOCODEs assigned to locations (areas) and sub-locations (points)

I. Background

1. Before the UN/LOCODE Advisory Group Meeting in May 2023, the experts proposed a list of topics, among which are how to deal with the codes that had become not conformant to the latest Recommendation 16 since its publication in 2020.
2. During the UN/LOCODE Advisory Group Meeting in May 2023, one expert proposed a feasibility study on establishing a UN/LOCODE official child code, aiming to solve multiple problems related to legacy non-conformant code and data quality.
3. Following the decision made at this meeting, under the UN/LOCODE Task Force, Subgroup 3, as one of four subgroups, was established, with the title of "Potential UN/LOCODE child code."
4. As far as experts understand, the scope of this subgroup is to address the co-existence of UN/LOCODEs assigned to locations and sub-locations.

I. A summary of the work

5. Virtual meetings were convened after the establishment of this subgroup, with minutes circulated and uploaded to Google Drive.
    - Meeting on 2 Nov. 2023
    - Meeting on 19 Dec. 2023
    - Meeting on 2 Feb. 2024
6. It was discussed to potentially establish the "UN/LOCODE official child code system" based on the following understanding and findings:
    - The child code mentioned is the code to identify sub-locations.
    - The child code system solves:
        a) Where to put the sub-location codes which duplicate its parent code location.
        b) A system owned and operated by UNECE to accommodate the requirements of the UN/LOCODE community, instead of turning to other organizations. There can be multiple child codes for the same location because they are from different organizations.
    - The advantages of the child code solution are as follows:
        a) It makes the code list conformant to the latest Recommendation 16.
        b) It does not affect anything because:
            i. The code list can be merged and separated (Two views of the same list).
            ii. The same maintenance practice continues.
7. Simple statistics about the number of codes for sublocations were conducted based on the SQL query of the published code list. It assumed that most of the entries identifying a sub-location have a "/" or "," in its location name. The result is that there are about 2398 such sub-locations. (1300 of them are not covered by the existing child codes systems since they do not have function "1" for ports or function "5" for the UPU International Mail Processing Centre.) This assumption may not be correct but can reflect the general situation of sub-locations caused by historical versions of Recommendation 16.

8. A draft definition of "sub-location" is:

    - A sub-location is a UN/LOCODE location that is fully conformant to the definition of location in Recommendation 16 but also is co-existing in the UN/LOCODE code list with another location that it is physically or administratively within.
    - "sub-location" is a relative concept and is determined by whether it has a parent location.
    - "sub-locations" are area locations on most occasions. The reason is that geographically, all locations are areas.
        a) Further study and discussions are needed on this, especially when it is related to the purpose of Recommendation 16.
        b) The "point or area" is not the real question.
    - There might be other types of relationship "within" between location and sub-location, for example, some ports in Canada identified with UN/LOCODE are assigned to a city far away. (The code cannot be found.)

II. Agreed principles.

9. Legacy codes shall not be deleted.

    - It is a general principle in information life cycle management not to delete information but to mark it as deletion.
    - Codes for duplicated locations should not be set invalid. The codes are highly possible to be used by users. The impact of such an operation cannot be evaluated.

10. No assignment of new codes to sub-locations shall be allowed.

    - For the time being, it is important to keep all new codes compliant with Recommendation 16.
    - Recommend that the Data Maintenance Request submitter apply for a child code.

11. For the first step, the nature of work is to "mark" the existing entries for the sub-locations by UN/LOCODE National Focal Points (NFPs) if nominated. This is a huge task for NFPs.

    - Location names with "/" or "," may not be all the sub-locations.
    - Other sub-locations cannot be easily identified.

12. Any new formal revision to Recommendation 16 is not feasible right now, e.g., the addition of columns.

    - A systematic approach is needed.
    - Practices in maintenance should be well considered.

III. Conclusion

13. Key concepts like sub-location have not been defined yet in the latest Recommendation 16. The real problem is not yet determined, and further studies are needed. The subgroup suggests continuing the study work in the future. To produce a white paper may be too ambitious. It is better to conduct more discussions for a list of more specific questions. Experts should be called to provide real examples to support the discussions.

Annex. 2 Report of Subgroup 4

UN/LOCODE Application Re-engineering

I. Introduction

1. The United Nations Code for Trade and Transport Locations (UN/LOCODE) Task Force – Subgroup 4 was launched at the UN/LOCODE Task Force kick-off meeting on 28 September 2023. Originally convened to oversee the testing phase of the revamped UN/LOCODE Web Frontend Application, the subgroup's mandate was subsequently broadened to include comprehensive technical exploration into fostering the sustainable development of the UN/LOCODE ecosystem.

2. The current UN/LOCODE system comprises three distinct sub-systems: Subsystem 1, which serves as the DMR Submission (Entry Portal); Subsystem 2, responsible for DMR Validation; and Subsystem 3, dedicated to Directory Publication. Identified during the summer of 2022, Subsystem 1 was flagged by OICT for non-compliance with UN OICT Security Standards, rendering it the sole UNECE system posing a cybersecurity threat to the UN. Subsystems 2 and 3 await audit by OICT. In light of these findings, OICT/ISU recommends the migration of the entire application, including all subsystems, to align with contemporary secure development standards.

3. The OICT UN/LOCODE ICT Audit Report recommended that the following issues be mitigated as a matter of urgency. In accordance with 5.1.2.2, it is imperative to conduct a thorough review of the application's business logic and to enforce best practices in account management within the codebase. It is highly advisable to integrate with reputable external enterprise authentication providers to enhance security measures. Furthermore, aligning with 5.1.2.3, it is crucial to disable directory listing, particularly for unauthenticated access across the entire web root. Additionally, immediate action is required to rectify SQL injection vulnerabilities by implementing prepared statements, as per 5.1.2.4. In response to these pressing cybersecurity concerns, a comprehensive work plan has been devised, not only to address these critical vulnerabilities but also to introduce necessary enhancements. For further details, please refer to Annex A – UN/LOCODE Application Re-engineering Workplan.

4. The sustainable development of the UN/LOCODE ecosystem is characterized by and involves the implementation of a robust and efficient ICT system for UN/LOCODE to meet future expectations. The proposed project aims to facilitate the establishment of the UN/LOCODE ecosystem and its sustainable development, including a new re-engineered ICT system, covering the whole UN/LOCODE data lifecycle, to maintain, generate, and publish the UN/LOCODE directory.

5. The meetings of Subgroup 4 were conducted virtually, with attendance ranging from 9 to 15 experts representing both public and private sectors, which included Non-Profit Organizations (NFPs), technical officers, software development experts, and other relevant stakeholders.

II. Summary of achievements, activities, and discussions

6. Enhanced Security Measures – Two-Factor Authentication: Implemented robust Two-Factor Authentication (2FA) encompassing the generation of unique, one-time random security codes with time-based validity. Strengthened security protocols include mandatory email verification at login, user registration, profile editing, and forget password/password reset functionalities.

7. Enhanced Password Security and Complexity: Implemented rigorous password checks aligned with the policies established by OICT to ensure robustness and complexity. These checks are enforced during login, profile editing, and user registration processes. Additionally, users are prompted to change passwords if they do not meet the specified criteria, enhancing overall system security.

8. User Support and Issue Resolution: Performed in-depth technical analysis of errors reported by users, discerning those attributed to known issues unrelated to recent fixes or developments. Engaged in proactive communication with users to seek clarifications and facilitate the reproduction of issues, supplemented by detailed screenshots. Provided users with comprehensive technical solutions to resolve identified errors. Documented both the error manifestations and their corresponding technical solutions for inclusion in future fixes. Acknowledged instances where immediate resolution fell beyond the current contract's scope, ensuring transparent communication with stakeholders regarding the constraints and commitments.

9. Enhanced Password Security: Implemented robust measures to ensure the secure storage of passwords using hashing techniques. Developed a hashing functionality within the database to encrypt passwords using one-way encryption. This involved the comprehensive hashing of all existing passwords stored in the database. Furthermore, established mechanisms to hash passwords before storage in the database for various scenarios, including registering new users, editing profiles, enforcing password changes upon login, and facilitating password resets for forgotten passwords. These measures significantly bolster the overall security posture of the system, safeguarding user credentials against potential breaches or unauthorized access.

10. Data Validation/Data Quality for DMR Submission: Implemented robust validation mechanisms to ensure the accuracy and integrity of latitude and longitude coordinates submitted through the Data Maintenance Request (DMR) process.

11. Data Validation/Data Quality - DMR Submission: Implemented robust validation for web links to ensure the integrity of data. This includes verifying if URLs adhere to a valid format, enhancing the accuracy and reliability of submitted information within the DMR system.

12. Data Validation/Data Quality - DMR Submission: Subdivision Selection: Implemented robust validation mechanisms to ensure accuracy and integrity in the selection process of subdivisions during Data Maintenance Request (DMR) submissions.

13. Deployment Support for TEST and UAT Environments: Provided comprehensive assistance and guidance for deploying system updates and changes to both TEST (Testing) and UAT (User Acceptance Testing) environments. This included facilitating the setup, configuration, and troubleshooting processes to ensure smooth deployment and testing of new features and enhancements.

14. Developed a comprehensive project plan outlining forthcoming tasks, including detailed estimations of costs and durations for each phase, ensuring thorough preparation and effective resource allocation.

15. Implemented a feature to dynamically display deployment environment messages on every page, specifically tailored for TEST and UAT environments. Enhanced functionality includes automatic suppression of messages in the PROD environment to avoid unnecessary clutter. In case of an invalid environment, users are promptly notified with an error message, ensuring seamless navigation and clarity throughout the system.

16. Review of Work Plan: Thorough assessment of the work plan with a focus on critical technical aspects including security measures, data validation, and enhancements to the technical source code.

17. Discussion on UI Wireframes: Deliberation of proposed UI wireframes for potential enhancements to the front-end application, fostering collaboration and alignment on design directions.

18. Testing of Re-engineered UN/LOCODE Web Frontend System: Rigorous testing of Subsystem 1 of the re-engineered UN/LOCODE Web Frontend System to ensure functionality, reliability, and user satisfaction.

19. Peer Evaluation of Technical Requirements: Peer evaluation of forthcoming technical requirements essential for the continued advancement of the UN/LOCODE system, promoting collective insight and expertise.

20. Discussion on DMR Submission Process Functionalities: Exploration of desired functionalities to enhance the DMR submission process, aiming for efficiency and user-friendliness.

21. Discussion on Data Validation Improvements: In-depth discussion on strategies to improve data validation processes, ensuring data accuracy and integrity.

22. Cybersecurity Resolution of Critical Issues: Addressing critical cybersecurity issues within Subsystem 1, prioritizing the safeguarding of sensitive data and system integrity.

23. UN OICT Cybersecurity Audit Report Review: Review and discussion of findings and conclusions from the UN OICT cybersecurity audit report, guiding future security enhancements and best practices implementation.

III. Recommendations

25. The UN/LOCODE Advisory Group – Subgroup 4, aligned with the Task Force's overarching objectives, scope, and ongoing activities, presents the following strategic recommendations:

- Continue to explore all available options and resources to improve both the short-term and long-term UN/LOCODE solution.

- Establishment of the UN/LOCODE Task Force – Subgroup 4 permanently in response to the technical issues with the UN/LOCODE subsystems, whereby guiding the UN/LOCODE Secretariat and Maintenance Team.

- Drafting of a UN/LOCODE eco-system roadmap towards the development of a complete UN/LOCODE application which will handle DMR submission, maintenance, and publication of the UN/LOCODE.

- Pilot the implementation of the use of GitHub for the UN/LOCODE data lifecycle.

- Functional improvements to the current UN/LOCODE system will be beneficial to improving the DMR submission process and data quality.
    - Data Quality Improvements
        - Integrate interactive geolocation referencing in the DMR submission form (geolocation identification - pinpointing or vector)
        - Field Validations
        - Bulk submission interface for National Focal Points via subsystem 1 - UN/LOCODE front-end web platform
        - Support UN/LOCODE Child-code implémentations
    - Real-time data exchange
        - Implementation of API or SQL Server Reporting Services (SSRS) Web Service

- Exploring in-kind contributions of technical assistance to solve critical software issues in the UN/LOCODE subsystems; whereby engaging experts with expertise in C+, C#, Visual Basic, SQL, .NET, and other similar languages.

- Revision to the current UN/LOCODE workflow processes to be more ideal with the current situation.

- Explore the possibility of in-kind third-party services for mapping integrations.

IV. Conclusion

26. The efforts of UN/LOCODE Task Force – Subgroup 4 have been instrumental in addressing critical challenges and advancing the sustainability and effectiveness of the UN/LOCODE ecosystem. From its inception to its current state, Subgroup 4 has navigated through multifaceted technical issues, cybersecurity concerns, and development initiatives with resilience and dedication.

27. The recognition of cybersecurity vulnerabilities within Subsystem 1 underscored the urgent need for comprehensive remediation efforts, as highlighted by the recommendations put forth by OICT. The subsequent formulation of a detailed work plan, coupled with the implementation of enhanced security measures and data validation protocols, reflects a proactive approach towards fortifying the integrity and reliability of the UN/LOCODE system.

28. Furthermore, the commitment to continuous improvement is evident in the diverse range of activities undertaken, including peer evaluations, discussions on UI wireframes, and testing of re-engineered systems. The virtual meetings of Subgroup 4 facilitated collaboration among experts from various sectors, fostering an environment conducive to innovation and knowledge exchange.

29. Looking ahead, the strategic recommendations presented by the UN/LOCODE Advisory Group – Subgroup 4 outline a clear path towards further enhancement and evolution of the UN/LOCODE ecosystem. The establishment of a permanent task force, exploration of in-kind contributions, and the drafting of a comprehensive ecosystem roadmap signify a collective commitment to shaping the future of UN/LOCODE in alignment with evolving needs and challenges.