

Architecture Vision for the Implementation of a Minerals Flow Data Sharing Solution (Minerals Flow Data Vault)

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2. List of Acronyms

CoC - Chain of Custody

RCM – Regional Certification Mechanism

ICGLR - International Conference on the Great Lakes Region

RINR - Regional Initiative against the Illegal Exploitation of Natural Resources

NMD – National Minerals Database (Member States Mineral Database)

RMD – Regional Minerals Database

3. Background

The Manual for the Regional Certification Mechanism delineates the minimum requirements of the Regional Certification Mechanism (RCM) and outlines the essential processes for its implementation. The RCM constitutes one of the six tools of the Regional Initiative against the Illegal Exploitation of Natural Resources (RINR) within the member states of the International Conference on the Great Lakes Region (ICGLR). Serving as a procedural guide, the manual's requirements aim to establish responsible mineral supply chains, encompassing various intermediaries such as mines/miners, traders, transporters, processing entities, and exporters dealing with the four Designated Minerals, commonly known as "3TG" (Tin, Tantalum, Tungsten, and Gold).

The implementation of the Minerals Flow Data Vault is geared towards modernizing and standardizing the tracking and reporting processes of mineral supply chains, both at the national level and across regional borders. The project concentrates on improving visibility, efficiency, and reliability in the mineral extraction and distribution sectors.

Its goal is to create a secure and transparent data-sharing platform (vault) to facilitate selected data exchange among ICGLR members. Additionally, the project aims to enhance the region's reputation and trustworthiness among international mineral buyers, especially those concerned with sourcing from Conflict-Affected and High-Risk Areas (CAHRAs).

Moreover, the project aspires to establish a collaborative, efficient, and transparent regional mineral trade ecosystem. By leveraging digital traceability and secure data-sharing technologies, the project seeks to elevate both the reliability of the mineral supply chain and the international standing of ICGLR member states.

4. Due Diligence Schemes and Technologies in the Minerals Sector

The succession of events in the wake of Dodd Frank enactment (including section 1502 and the ensuing SEC rule on conflict minerals), has led to a confusing, unnecessarily complex situation for mineral supply chain participants in the Great Lakes Region (GLR).

In theory, to export their minerals without restrictions, GLR operators must conform to the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (OECD Guidance), for the OECD Guidance is endorsed by

regulators, downstream actors and international standard setting organizations as the reference framework for supply chain risk management. Complying with the OECD Guidance means, for all supply chain participants:

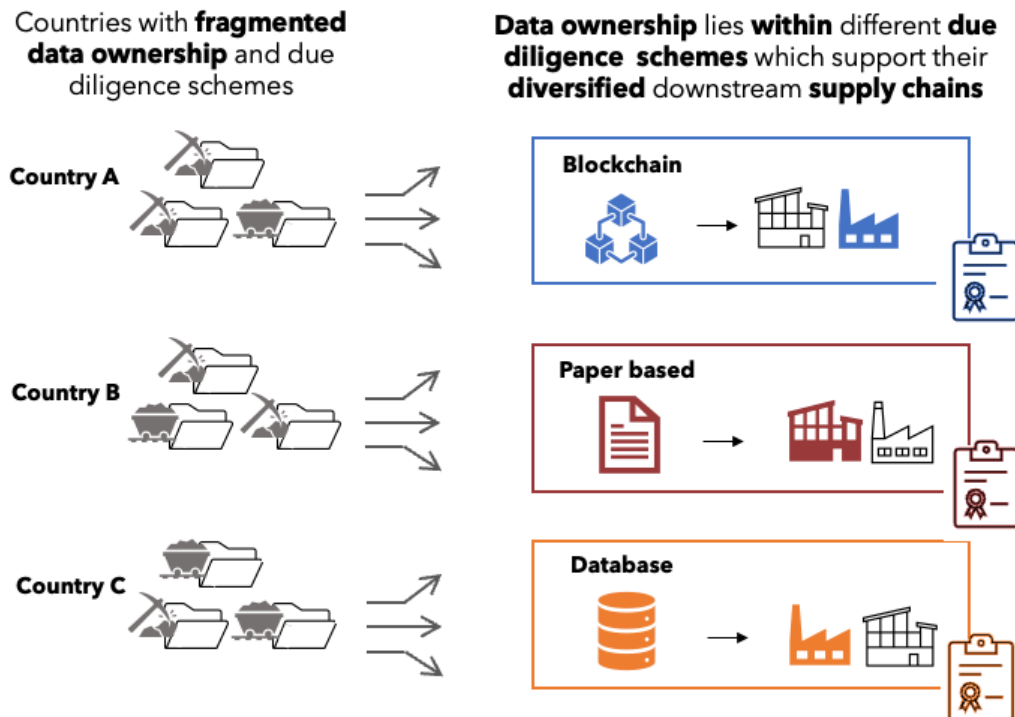
- Implement risk management systems consistent with OECD Guidance Step 1
- Identify and assess risk consistently with OECD Guidance Step 2
- Manage and mitigate risk in accordance with OECD Step 3
- Expect the receiving smelter or refiner to be independently audited, per OECD Step 4
- Report and publish relevant due diligence information in line with OECD Step 5

In practice, GLR operators have not been capacitated to comply with the OECD Guidance, but rather have been forced to follow instructions from presumed experts /due diligence schemes). Fragmentation of due diligence compliance was caused by a range of factors including:

- Development of the OECD Guidance was concurrent to the early deployment of a mineral traceability solution called ITSCI Program, deployed by the International Tin Association (ITA) – as such interpretation of the Guidance was articulated around accommodating ITSCI.
- In parallel, the Regional Certification Mechanism (RCM) was created by the ICGLR to guide regulation domestication and implementation by Member States. As development of the RCM followed the launch of ITSCI, its design and principles were primarily designed to accommodate ITSCI.
- ITSCI and the RCM largely contributed to turning the due diligence mandate into a box-ticking traceability approach.
- Smelter audit programs such as the industry-led Responsible Minerals Assurance Program (RMAP) were also, in their early days, articulated around accepting ITSCI-certified materials, to provide an avenue for legitimate procurement from the GLR.

As such, and for a long time, both Member States and GLR operators have found themselves in the obligation to use ITSCI, or traceability systems replicating the ITSCI model. During the last years several other due diligence schemes approached the market like MINEXX or Better Mining.

These due diligence schemes create monopsonies in the market due to the current inability for state actors to enforce their own data sovereignty. The technological solutions used by these due diligence schemes vary from paper-based schemes (ITSCI) over database driven up to the use of distributed ledgers.



5. Challenges for the implementation of the Regional Certification Mechanism

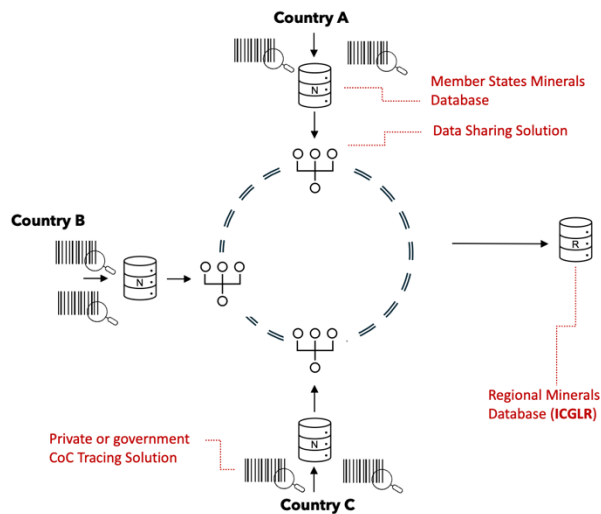
Several challenges are the result of the current situation which should be addressed by any future solution:

- The predominant use of non-digital, disparate traceability schemes, such as ITSCI, resulting in significant data management inefficiencies.
- The lack of a unified data standard, leading to poor interoperability among existing mineral traceability platforms.
- Insufficient government oversight on the entire chain of custody of mineral sites.

6. Architecture Vision

6.1. High Level Architecture Requirements by RCM

The RCM requires the member states to collect relevant CoC data and transfer them to the Regional Minerals Database.

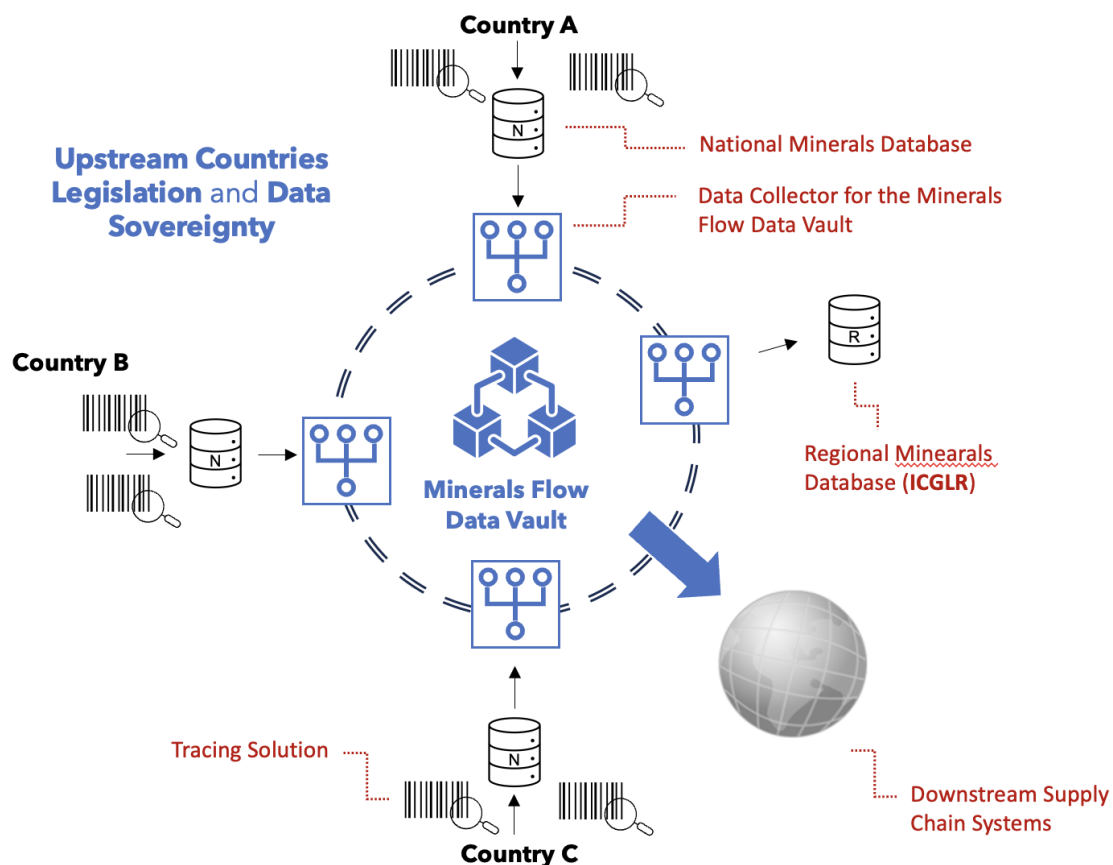


Requirements RCM...

- 5.1.4 Each MS shall ensure all mine site, CoC and Exporter data collected in line with RCM Requirements is **collated in a MS Mineral Database**
- 5.15 MS to ensure **transfer to the RMD** in a compatible format and timely manner, all country-level mine site, CoC and Exporter data
- 5.17. CoC systems should **transfer to the Member State Mineral Database** in a compatible format and timely manner, any mine site, CoC and Exporter data collected in line with the Requirements of the RCM

6.2. High Level Target Architecture Picture for a Data Sharing Solution

The implementation of the RCM requires to implement several components which are described below.



6.3. Component: Minerals Flow Data Vault and Minerals Data Collector (Data Sharing Solution)

The "Minerals Flow Data Vault" is a crucial architecture component designed to facilitate a secure and transparent tracking system for mineral supply chains. Implemented as a distributed, decentralized or centralized database or distributed ledger of "Minerals Data Collectors", this component ensures data sovereignty, immutability and reliability. Both components together create the data sharing solution.

Distributed, Centralized or Decentralized Storage: The Minerals Flow Data Vault employs a distributed database (ledger) or centralized database, allowing the storage of information across either multiple nodes or servers or a central data storage with fail overs, reducing the risk of a single point of failure.

Immutability: Utilizing the principles of a distributed ledger or a centralized database approach, the data stored in the vault becomes immutable, meaning that once information is recorded, it cannot be altered or tampered with, enhancing the integrity of the mineral supply chain data.

Secure Data Sharing: The architecture prioritizes secure data sharing among participants within the International Conference on the Great Lakes Region (ICGLR), fostering collaboration while maintaining data confidentiality and integrity.

Traceability: Leveraging the distributed nature of the database or ledger, the Minerals Flow Data Vault enables comprehensive traceability of minerals from extraction to export points, promoting accountability and transparency.

Efficiency: The nature of the architecture enhances the efficiency of data retrieval and verification processes, enabling real-time monitoring of mineral transactions across the region.

Interoperability: The system is designed to ensure interoperability among ICGLR member states, allowing seamless data exchange while maintaining a standardized and consistent approach to tracking mineral flows.

Resilience: Databases or ledgers inherently offer resilience to system failures or attacks, ensuring the continued availability of critical mineral supply chain data even in the face of disruptions.

6.4. Component: National Minerals Database

The "National Minerals Database" serves as a fundamental architecture component designed to cater to the specific requirements of each member state within the International Conference on the Great Lakes Region (ICGLR), aligning with national legislation and emphasizing data sovereignty.

Legislation Compliance: The National Minerals Database adheres closely to national legislation regarding mineral extraction and trade, ensuring that the data it contains complies with the specific legal frameworks of each member state.

Data Sovereignty: Emphasizing data sovereignty, the database prioritizes the ownership and control of mineral-related information by the respective national governments, safeguarding their authority over the data generated within their borders.

National Focus: Tailored to meet the unique needs of individual countries, the database concentrates on providing detailed information on mineral extraction, processing, and export activities at the national level.

Integration with National Systems: The architecture seamlessly integrates with existing national systems, promoting efficiency and minimizing disruptions in data sharing between the National Minerals Database and other government databases.

Security Measures: Recognizing the sensitivity of mineral-related data, the National Minerals Database incorporates robust security measures to protect against unauthorized access and ensure the confidentiality of critical information.

Standardization: While respecting national differences, the architecture component also adheres to standardized data formats and structures to facilitate effective communication and collaboration among ICGLR member states.

Auditability and Accountability: The database incorporates features that enable auditability and accountability, allowing national authorities to trace and verify the accuracy of data entries, thereby enhancing trust in the information provided to the Minerals Flow Data Vault at the regional level.

6.5. Component: Tracing Solution (CoC Solution)

The "Tracing Solution" is a pivotal architecture component designed to capture essential information directly from mine site operations and aggregate this data into the National Minerals Database, ensuring comprehensive tracking and accountability within the mineral supply chain.

Data Collection at Mine Sites: The Tracing Solution supports the collection of core information directly from mine site operations, including data on mineral extraction, processing, and transportation.

Data Aggregation: The Tracing Solution aggregates the collected data into a centralized repository, ensuring that all relevant information from mine sites is consolidated for further analysis and reporting.

Integration with National Minerals Database: Seamlessly integrated with the National Minerals Database, the solution feeds core information directly into the database, enriching its content with detailed insights from mine operations.

Standardized Data Formats: To ensure compatibility and consistency, the "Tracing Solution" utilizes standardized data formats and protocols for data transmission and storage, facilitating smooth integration with the national database.

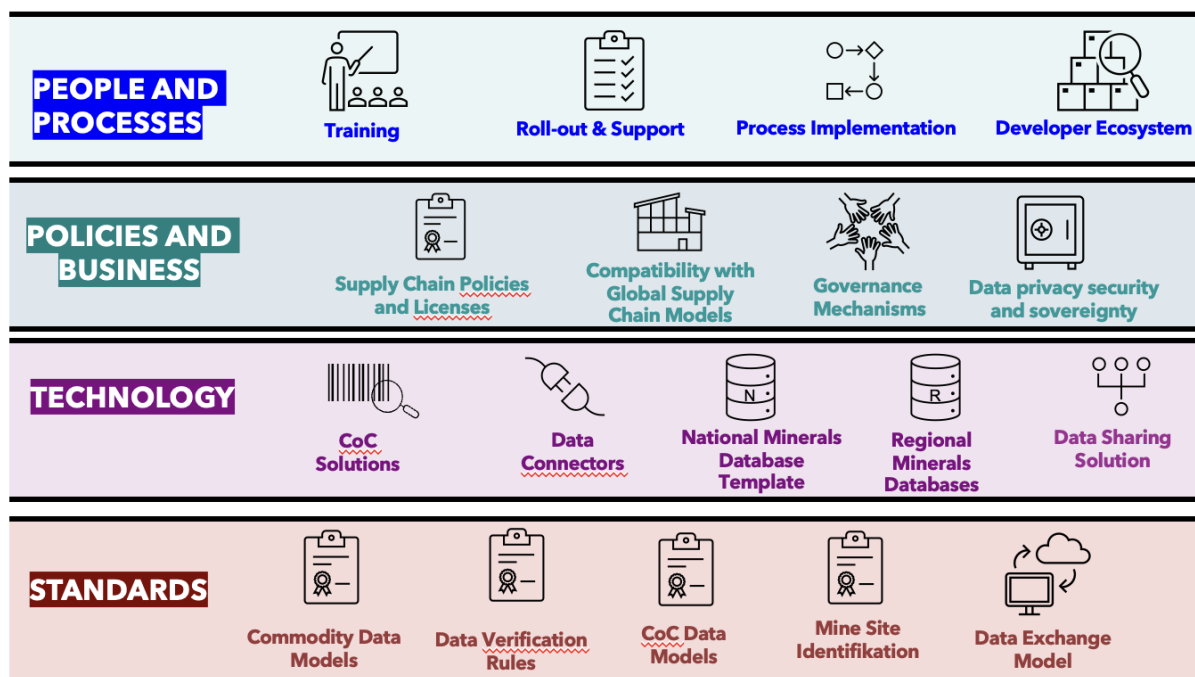
Quality Assurance: The solution incorporates quality assurance measures to validate the accuracy and integrity of the collected data, minimizing errors and discrepancies in the information transmitted to the National Minerals Database.

Enhanced Transparency and Accountability: By providing transparent and verifiable data from mine sites, the "Tracing Solution" enhances transparency and accountability throughout the mineral supply chain, fostering trust among stakeholders and supporting sustainable resource management practices.

7. Implementation Approach

7.1. Overview

The execution of the Minerals Flow Data Vault necessitates addressing various domains. It's important to note that not all aspects will be encompassed within a singular program; instead, they may be tackled by distinct projects involving different partners. These projects could be funded by diverse donors and operate under the legislative frameworks of different countries. Despite this diversity, the overarching approach offers a strategic perspective for the comprehensive implementation of the program.



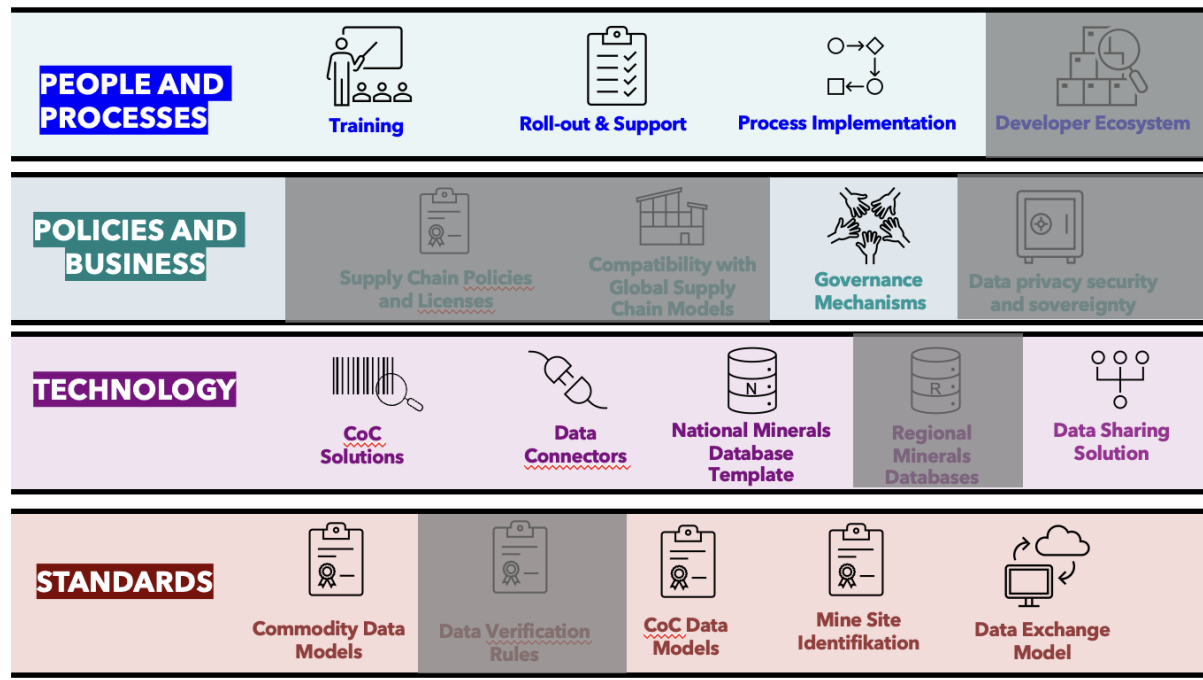
The implementation covers several streams like:

- **People:** Establish the respective processes and enable an overarching ecosystem.
- **Business Enablement:** Create chances for new business models and define new and innovative participation mechanisms.
- **Technology:** Implement state of the art digital solutions based on open-source technologies.
- **Standards:** Define and implement cross technology standards for interoperability between several systems.

7.2. Country-Level Focus

On country level the focus would be on:

- **Tracing Solution:** Transition 90% of mine sites from the traditional ITSCI system to a digital traceability solution overseen by country.
- **Data Connector:** Implement connectors for seamless data transfer to a National Minerals Database, significantly enhancing data visibility, accuracy, and governance by the member state.



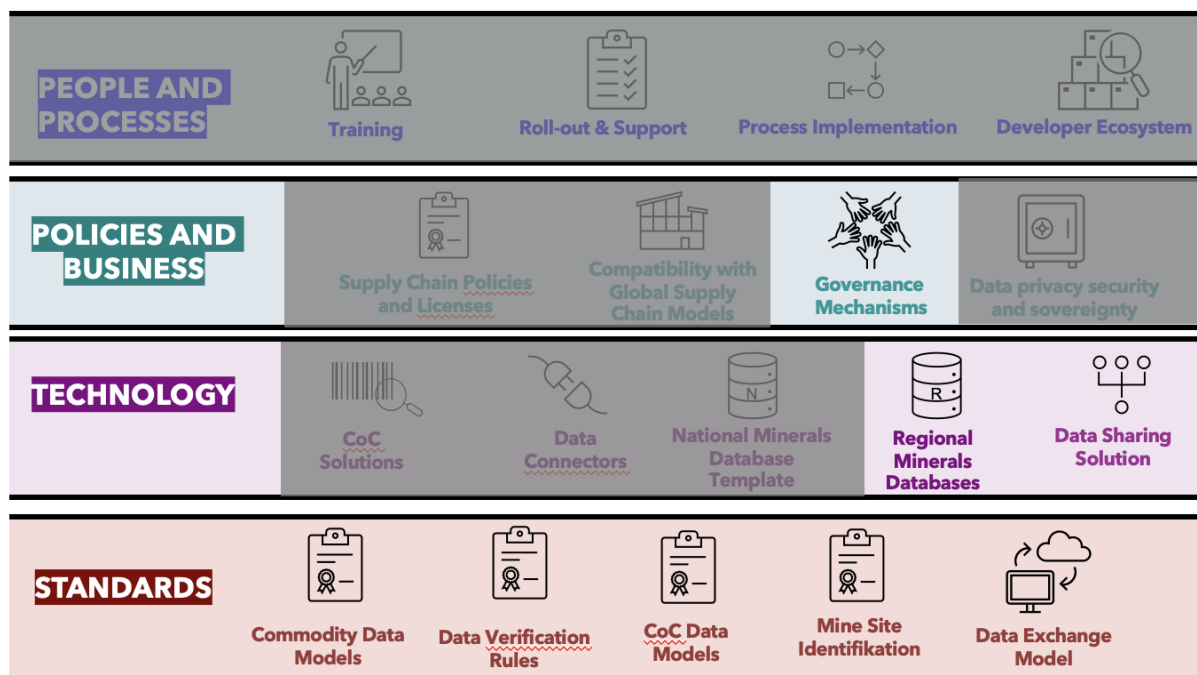
Required Steps:

- Development of a user-friendly digital tracing solution.
- Establishment of collaborative data-sharing standards among all stakeholders to ensure cohesive and standardized data collection practices.
- Establish core data sharing standards within the national legislation

7.3. Regional-Level Strategy

On regional level the aim is to foster trust and collaboration among International Conference on the Great Lakes Region (ICGLR) member states through standardized, secure data sharing. The focus would be on:

- Creation of a secure, transparent data sharing platform (vault) to facilitate selected data exchange among ICGLR members.
- Enhancement of the region's reputation and trustworthiness to international mineral buyers, particularly those concerned with sourcing from Conflict-Affected and High-Risk Areas (CAHRAs).



8. Summary

The implementation of the Minerals Flow Data Vault involves a comprehensive approach, acknowledging the need to cover diverse areas. Rather than consolidating all aspects within a single program, the strategy involves multiple projects led by different partners, funded by various donors, and adhering to the legislations of different countries. This decentralized approach allows for targeted initiatives, addressing specific facets of the mineral supply chain. Despite the diversity in execution, there is an overarching strategic framework guiding the implementation. This ensures a holistic and systematic deployment of the Minerals Flow Data Vault, emphasizing transparency, data sovereignty, efficiency, and adherence to national regulations across the International Conference on the Great Lakes Region (ICGLR) member states.