Automated data sharing / verification solution for risk management of new, used and damaged battery shipments

79th SMDG Plenary Meeting - 3rd Apr 2025



New, Used and Damaged Lithium Batteries

Deflagration and Lithium Battery Risk Exposure

In the event of deflagration

- Oxygen not needed
- Heat not needed
- Fuel the cell and/or the battery itself

To lower the risk of deflagration

- Risk = Likelihood x Impact
- Impact: deflagration event
- Decrease the likelihood:
 - Conduct technical analysis
 - Ship only with State of Charge below certain thresholds





Image Source: www.firehouse.com

Current Situation

- IMDG code has no requirements for used, undamaged batteries (only for new/damaged)
- State of Health (SOH) in EU Battery Regulation Annex VII doesn't align with realistic parameters. Some of the industry stakeholders view **the approach as oversimplified**, failing to account for the complex performance characteristics and degradation patterns across different battery chemistries.
- Different lithium-ion battery chemistries like NCM (Nickel Cobalt Manganese) and LFP (Lithium Iron Phosphate) complicate the implementation of a "blanket solution" in battery technologies, making a single universal approach impractical.

SOC & SOH



- Measures the current battery capacity as a percentage of its maximum charge
- Similar to a fuel gauge in conventional vehicles
- Decreases during use
- Increases during charge
- Calculated using voltage, current and temperature measurements



- Measures battery's current maximum capacity compared to its original/factory capacity
- Indicates long-term battery degradation over time
- Decreases gradually over battery lifespan
- Used to estimate remaining battery life

Risk Level Associated with Used & Damaged Batteries

These levels must be declared by a "technical expert" of producer or authorized agent.



Level 1

Used,

Level 2

Damaged, still meeting UN38.3 criteria



Level 3

Damaged, not meeting UN38.3 criteria

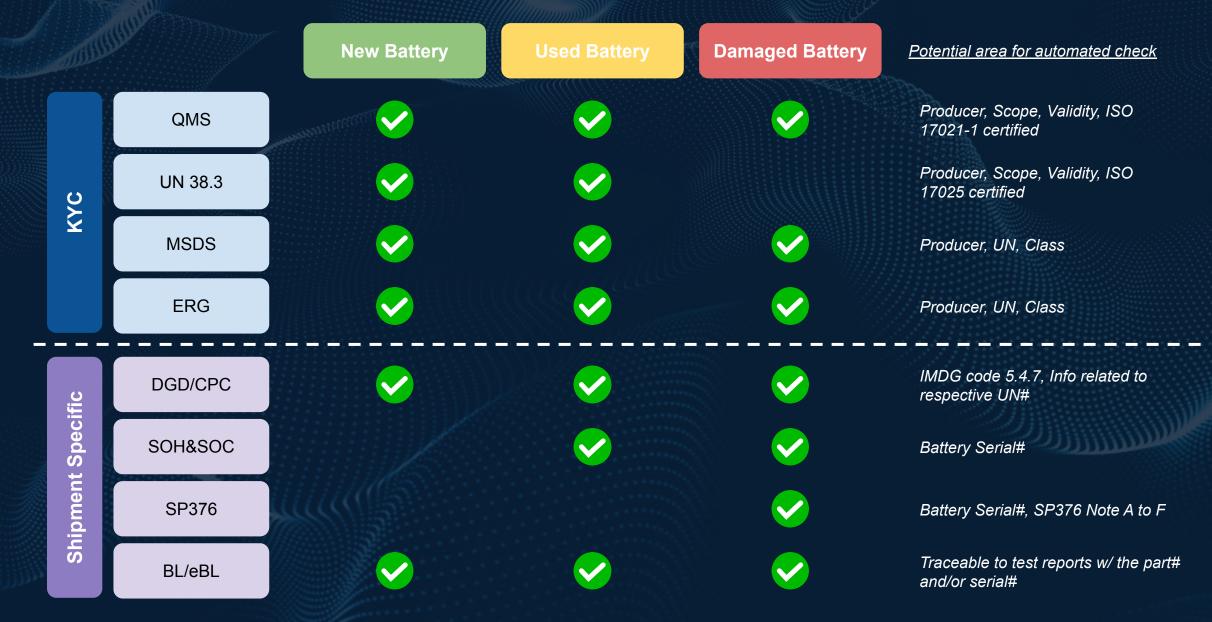
still meeting UN38.3 criteria



Critically damaged, not meeting UN38.3 criteria

Level 4

Document requirements - under discussion process



Benefits of SOC & SOH for used battery and damaged battery



Additional tool for risk assessment* by both shippers and carriers.



Reduction of incidents based on the SOH analysis of the batteries (not mandatory in IMDG code).



Clear reference document to establish liability in case of incidents.

* Legal basis for SOH as declaration in EU Battery Regulation 2023/1542 Annex 14.4(b)

CDC booking document submission through a digital portal on GSBN

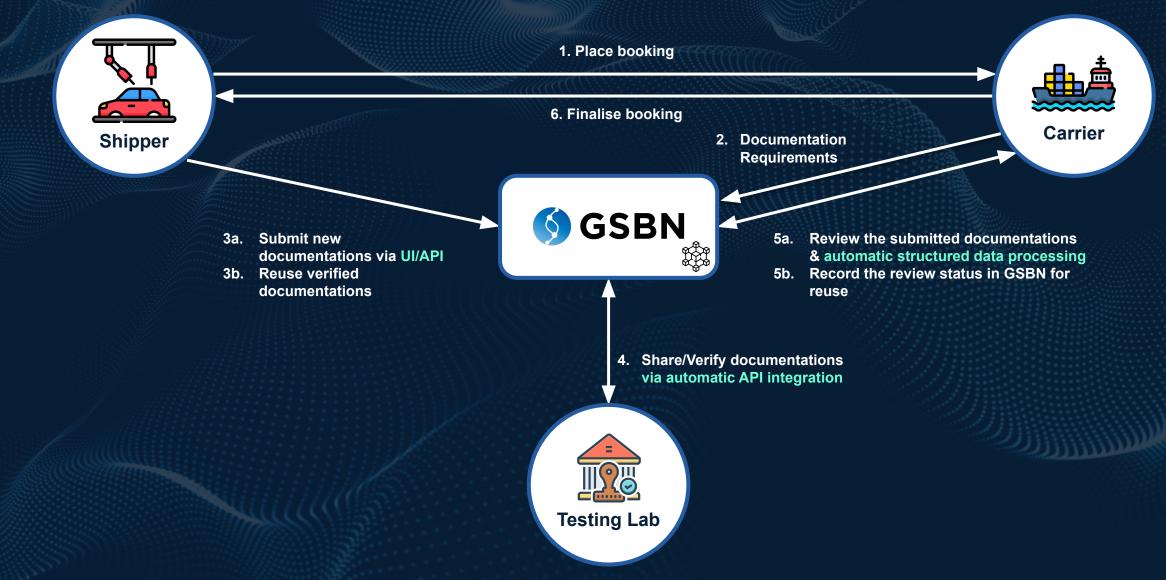
Scope of the pilot

Instead of using emails to submit documents, a major EV manufacturer (as shipper) has piloted with a major shipping line on the use of a digital portal to upload CDC documents on GSBN.

Benefits:

- 1. Efficient shipper can reuse previously verified documents.
- 2. Automation with structured data shared by labs, carriers can automate checking processes.
- 3. Immutable documents are written on blockchain, thus are tamper-proof.
- 4. Auditable the full life cycle of the documents from submission to verification are logged on blockchain/ this could be important for claims with P&I

Document Submission Process



All transactions are protected by the GSBN blockchain platform to provide full traceability and auditability.

Document Submission UI for Shipper

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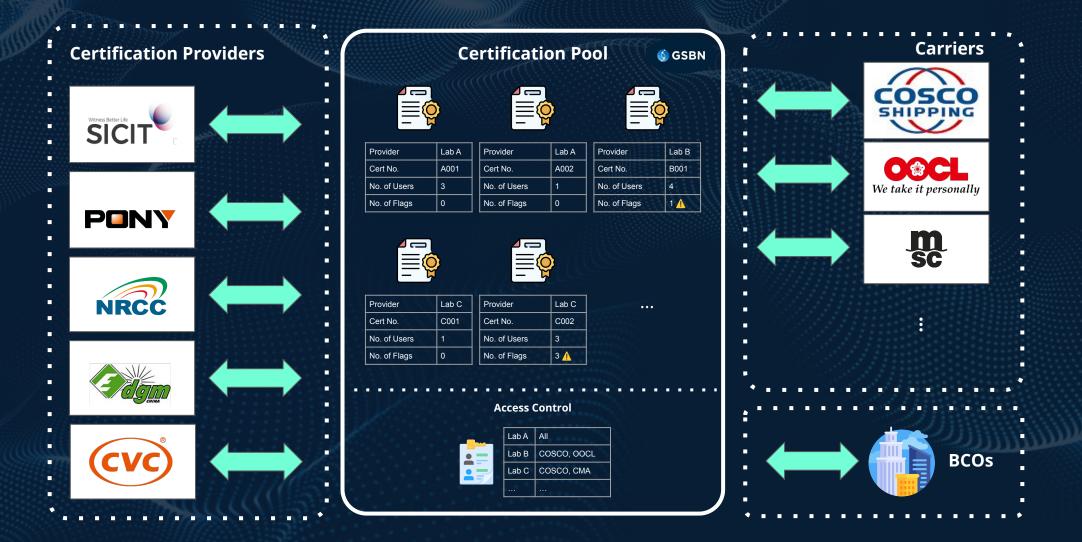
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Key functionalities:

- 1. Shippers can search for DG booking created by carrier.
- 2. In each booking, carrier would have already outlined the required documents.
- 3. Shipper can select previously uploaded documents or upload new documents.

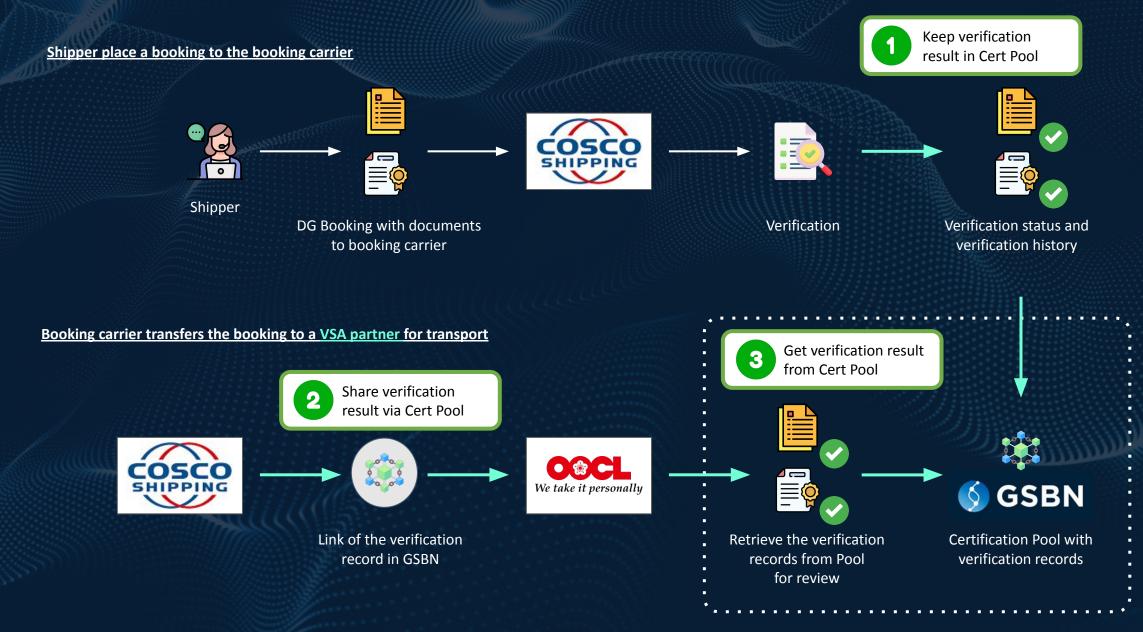
Certification Pool & Certificate Sharing between VSA Partners through GSBN

Certification Pool



Certification Pool can act as a **single source of truth** for stakeholders to record and share information about the certificates.

Certification Pool to Facilitate Sharing of Certificates



Certification Pool to Facilitate Sharing of Certificates

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- Source of the Certificate
- 2 Product Name and Manufacturer
 - Certificate Number (Link to GSBN)
 - Related Certificates (such as MSDS, 38.3 Test Report, etc.

Verification Results

Verifier (Verification History can also be kept for audit)

Entrust Code : 2124007931263	17	Effective Date : 2024-02-03	Expiry Date : 2025-01-01			
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