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FAQ ON DIGITAL BUNKERING IN SINGAPORE



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PREAMBLE



The Singapore Shipping Association (SSA) acknowledges the growing significance of digitalization in the maritime sector and its transformative influence on bunkering practices. Digitalization is increasingly crucial for optimizing operations, promoting transparency, and fostering sustainability. In line with this, the SSA, with the backing of the Maritime and Port Authority of Singapore (MPA), is spearheading this Digital Bunkering FAQ initiative. This initiative promotes the adoption of Electronic Bunker Delivery Notes (eBDN) to streamline and digitize the bunkering process for various fuels.

This FAQ document has been carefully crafted to serve as a valuable resource for the shipping community seeking guidance on addressing queries related to eBDN implementation. It features essential questionnaires designed to assist stakeholders in navigating the complexities of adopting eBDN in bunkering activities within the Port of Singapore.

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ABOUT THIS DOCUMENT

The SSA Marine Fuels Committee has formed a dedicated Digital Bunkering Workgroup to prepare guidelines for SSA members on Digital Bunkering in Singapore, increase awareness on the matter and collaborate with MPA and other stakeholders. The Working Group who are responsible for the preparation of this FAQ document, consists of the following Members:

	Name	Organisation
Chairman	Mr. Collin Ng	Equatorial Marine Fuel Management Services Pte Ltd
Digital Bunkering Workgroup Members	Mr. Alan Van Thillo	Anglo Eastern Shipmanagement Singapore
	Mr. François-Xavier Accard	CMA CGM International Shipping Company Pte Ltd
	Ms. Jenny Liaw	Equatorial Marine Fuel Management Services Pte Ltd
	Mr. Aaron Tan Tiong Bing	Global Marine Transportation Pte Ltd
	Mr. Sherman Yeo	Minerva Bunkering Pte Ltd
	Mr. Richard Ho	Ocean Network Express (Singapore) Pte Ltd
	Ms. Vanessa Xavier	Peninsula Petroleum Far East Pte Ltd
	Mr. Praveen Sah	Seapeak Maritime (Singapore) Pte Ltd
	Mr. Ashish Chaurasia	Teekay Marine Singapore Pte Ltd
	Mr. Koo Soo Yong	TFG Marine Pte Ltd
	Mr. Khee Chia How	TFG Marine Pte Ltd
	Mr. Leslie Tan	United Maritime Pte Ltd
	Mr. Nizam	United Maritime Pte Ltd
Mr. Benjamin Thang	United Maritime Pte Ltd	
Mr. Rahul Choudhuri	Veritas Petroleum Services	

SSA would also like to acknowledge the following organisations who had provided their feedback and input in the preparation of the FAQs:

Name	Organisation
Ms. Eunice Low	ADP Clear
Mr. Ang See Lin	Angsana Technology
Mr. Goh Kwong Heng	BTS / ZeroNorth
Mr. Leon Ling	Bunkerchain

1.0 GENERAL & MPA REGULATIONS

FAQ 1.01 What is eBDN?

An electronic proprietary document of the bunker supplier providing details of the quality and quantity of the bunker(s) delivered by the bunker tanker to the vessel. It is a standard document required by regulation 18 of MARPOL Annex VI.

FAQ 1.02 What are Digital Bunkering Document?

These are the electronic equivalent of paper bunkering documents customarily used within supply-chains to exchange business and operational information according to established business protocols and Singapore's standards used in the bunkering industry (such as SS 648 and SS 660). Examples of bunkering documents include bunker requisition form, mass flow metering system seals checklist, meter reading record form, bunker delivery note, etc.

FAQ 1.03 When will the eBDN be implemented for the bunkering industry in the Port of Singapore?

As per MPA Marine Port Circular PMC 12 of 2023, from 1st November 2023, bunker suppliers can start issuing electronic bunker delivery note (eBDN) and bunkering documentation required under the Singapore Standard (SS 648 – Code of practice for bunker mass flow metering) through the digital bunkering solutions whitelisted by MPA.

The four (4) whitelisted companies¹ are:

1. ADP Clear
2. Angsana technology
3. BTS/ZeroNorth
4. BunkerChain

FAQ 1.04 Is eBDN mandatory in Singapore?

Not yet, but it is expected to be made mandatory. MPA will update the industry accordingly.

All stakeholders are strongly encouraged to adopt and use the eBDN during this period for crew familiarity.

¹ Note: As of 11 January 2024

FAQ 1.05 What steps are taken to ensure the compatibility of different eBDN systems used by various stakeholders in the bunkering industry?

To ensure the compatibility of different eBDN systems used by various stakeholders in the bunkering industry, the Maritime and Port Authority of Singapore (MPA) is working closely with the industry-led Singapore Standards Council to develop new Standard on Specification for digital bunkering supply chain documentation. The standard is expected to be implemented by 1H 2024 and all whitelisted digital bunkering solutions are required to comply with the Standard.

FAQ 1.06 Who is/are exempted from receiving eBDN?

eBDN will apply to ships regulated under regulation 18 of MARPOL Annex VI.

FAQ 1.07 How can shipowners / Ship operators that wish to volunteer in the eBDN trial period as of 1st of November participate?

The eBDN trials are tapering off with the go-live of the digital bunkering initiative since 1 Nov 2023. Nevertheless, to carry out commercial trials, please write in directly to the whitelisted solution providers - contact details available at <https://www.mpa.gov.sg/port-marine-ops/marine-services/bunkering/digital-bunkering>.

For Receiving Vessels Ship Owners, please contact your bunker suppliers instead.

FAQ 1.08 Can the digital bunkering solution facilitate comments from bunker receivers during bunkering disputes?

Additional documents such as the Statement of Fact, Note of Protest, etc. can be completed electronically or uploaded onto the digital bunkering solution for issuance together with the rest of the bunkering documentations.

FAQ 1.09 Will eBDN be mandatory for all fuel types, including bio-fuel, ammonia, methanol, and LNG bunkering in Singapore Port?

eBDN issued in Singapore apply to fuels in accordance with Regulation 18 of MARPOL Annex VI and will gradually cover alternate fuels in accordance with applicable statutory requirements.

FAQ 1.10 How will the physical stamping of the receiving vessel's Chief Engineer be carried out?

Chief Engineer could prepare the electronic vessel stamp in advance by capturing an image (scanned/ photograph) of the stamp and uploading it onto the device/ computer which would be used to access the digital bunkering solution(s). Alternatively, some of the digital bunkering solutions(s) support the generation of the electronic vessel stamps for application.

FAQ 1.11 Where can I get more information on the eBDN process?

Please refer to a step-by-step flowchart prepared by MPA: <https://www.mpa.gov.sg/port-marine-ops/marine-services/bunkering/digital-bunkering>.

Alternatively, you can email at DigitalBunker@mpa.gov.sg or bsd@mpa.gov.sg.

FAQ 1.12 Are all the shipping agents aware of the eBDN initiative and will they be able to guide the shipowners / operators that wish to participate?

MPA is committed to ensuring comprehensive awareness and support for shipowners and operators interested in participating.

To facilitate a smooth onboarding process, awareness campaign and circular have been rolled out to inform and educate all relevant stakeholders, including shipping agents. This initiative aims to ensure that shipping agents are well-informed about the eBDN trial and are equipped to guide interested shipowners and operators through the participation process.

FAQ 1.13 What is the implementation timeline for Digital Bunkering?

To enhance efficiency and transparency of bunkering in Singapore, MPA launched the digital bunkering initiative to implement electronic bunkering processes and documentations, such as electronic bunkering digital note (eBDN), from 1 November 2023. Over 100 trials have been conducted since January 2023, involving more than 20 companies in the Singapore bunkering ecosystem.

Feedback from users will continue to be gathered to improve these solutions with plans to make digital bunkering a mandatory requirement before end-2024. MPA also continues to explore and work with the industry on other enhancements, including automating the data flow from Mass Flow Meters (MFM).

As such, all MPA licenced bunker suppliers and craft operators are strongly encouraged to adopt digital bunkering at the earliest possible date, for the familiarisation of the cargo officers and crew. The Annex of PMC (No. 12 of 2023), provides the guidelines for the use of digital bunkering service for the bunker supplier, bunker craft operator and the vessel receiving bunkers.

FAQ 1.14 For suppliers that adopt Digital Bunkering, do they still require to manually update bunker sales volume? If yes, when will MPA stop manual reporting?

All bunker suppliers are still required to report their monthly bunker sales volume via digitalPORT@SG™ portal until they are able to demonstrate consistency between the sales volume data submitted via digitalBunker and digitalPORT@SG™ portal.

FAQ 1.15 Will the suppliers be required to submit data for loading and ship-to-ship in addition to delivery operation?

Yes, all these data will be required to be submitted once digital bunkering is mandated.

FAQ 1.16 Who is supposed to procure, install, subscribe, and maintain the digital solutions?

It will be the bunker supplier's responsibility to ensure eBDN issuance, including all necessary SS648 bunkering documentation. Monthly bunker sales volume information is also required to be submitted to MPA by the suppliers. MPA will not be a party to any commercial discussions between the suppliers, craft operator, digital solution providers or any other stakeholders.

FAQ 1.17 Which digital bunkering solutions can be implemented in Singapore?

Only the MPA-whitelisted digital bunkering solutions can be implemented in Singapore. The list of whitelisted solutions is available at <http://www.go.gov.sg/digital-bunkering> which will be updated as more solutions get whitelisted or delisted.

FAQ 1.18 Can hard copy BDN be issued to vessel?

Bunker suppliers can still issue paper BDN until digital bunkering is made mandatory. However, suppliers are strongly encouraged to adopt digital bunkering early to enjoy the benefits. Those suppliers that have already embarked on the digital platform may not be required to issue physical BDN.

Bunker suppliers that implemented digital bunkering solutions should encourage their customers not to use paper BDN. But if customer insists on paper BDN or where situation necessitate, supplier could use the eBDN as the original record to generate the paper BDN.

FAQ 1.19 Is it required for our Cargo officer to go onboard the receiving vessel to do the necessary paperwork?

For suppliers that have implemented digital bunkering solution, cargo officers are not required to go onboard the receiving vessel for bunkering paperwork, as the unique link and/or password will be sent to the receiving vessel for the Chief Engineer/Master to complete the bunkering documentation electronically.

FAQ 1.20 What is the process of approval for installing digital bunkering solution onboard a bunker tanker?

The digital bunkering solutions are mobile and web-based applications and can be accessed using internet-enabled devices that are secured and patched, i.e., laptop, computer, tablets, handphones, etc. However, barge operators must ensure that installation of any internet devices onboard as necessary must be in accordance with applicable flag/class rules. MPA must be updated on the suppliers and the barges that have been upgraded for digital bunkering and the service provider. No modification of the MFM or the MFM system is normally required for the installation of digital bunkering solution. However, in the event it is required, it must be done only with MPA's approval.

FAQ 1.21 Will digital bunkering be incorporated into Singapore standards for bunkering?

The revision of the existing SS648:2019 Code of Practice of Bunker Mass Flow Metering is being developed by the industry-led Singapore Standards Council to support electronic bunkering documentation and is expected to be completed during 2024. In addition, a new Specification for Digital Bunkering Supply Chain documentation is expected to be published in the first half of 2024 to enable standards and interoperability between different systems.

FAQ 1.22 What should the supplier/craft operator do in the event where the customer, Master/Owner refuse to accept the eBDN or participate in Digital Bunkering?

The supplier/craft operator shall engage and inform the customer, Master/Owner in advance regarding the conduct of digital bunkering and the issuance of electronic documents. The port marine notice on digital bunkering could be presented to the customer, Master/Owner to inform them on Singapore's implementation of digital bunkering.

FAQ 1.23 Would MPA's approval be required for the change of digital solution provider?

MPA's approval is not required for the change of whitelisted digital solution providers. However, MPA should be informed.

FAQ 1.24 What are the procedures required for the update/upgrade of the digital system?

Solution providers must inform MPA prior to the update/upgrade of their digital system. The list of system changes shall be provided to MPA for approval.

FAQ 1.25 How will the B2G reporting be transmitted to MPA and how will we know that it has been successfully transmitted?

The B2G reporting, along with the status of transmission, will be available via the digital bunkering solution.

FAQ 1.26 How long must the supplier and the receiving ship retain the eBDN?

In accordance with regulation 18 of Marpol Annex VI, the eBDN must minimally be retained for a period of three years after the fuel oil has been delivered on board. Suppliers in this regards must also retain the eBDN for at least three years from the date of the delivery. This should form part of the QMBS requirement under SS 524.

2.0 EBDN TECHNOLOGY

FAQ 2.01 What happens if there are no computers / capable devices onboard?

The Chief Engineer can complete the workflow using his mobile devices. As a last resort, and in the unlikely event, the bunker supplier will provide a tablet to the receiving vessel sign in the eBDN app with his credential that was emailed to the vessel. At the end of operations, all relevant electronic bunker documents will also be emailed to the vessel.

FAQ 2.02 What happens when there are network connectivity issues for both the ship owner and bunker tanker supplier?

Refer to MPA's PMC (No. 12 of 2023) for the guidelines for bunker suppliers, bunker craft operators, and vessels receiving bunker, to enable smooth and efficient transition into digital bunkering. The whitelisted solutions provide various offline mode capabilities to complete the electronic workflow and documentation, and the data will be synchronised once Internet connectivity is reestablished

FAQ 2.03 What happens if a vessel does not have or are not able to provide digital electronic stamp onboard?

Chief Engineer could prepare the electronic vessel stamp in advance by capturing an image (scanned/ photograph) of the stamp and uploading it onto the device/ computer which would be used to access the digital bunkering solution(s). Alternatively, some of the digital bunkering solutions(s) support the generation of the electronic vessel stamps for application.

FAQ 2.04 What happens if a vessel does not have or are not able to provide digital electronic signatures onboard?

Chief Engineer could prepare the electronic vessel signatures in advance by capturing an image (scanned/ photograph) of the signatures and uploading it onto the device/ computer which would be used to access the digital bunkering solution(s). Alternatively, some of the digital bunkering solutions(s) support the generation of the electronic vessel signatures for application.

FAQ 2.05 What are the consequences if the eBDN is not properly transmitted from the supplier to the receiver?

Suppliers must ensure that the vessels receive the bunkering documentations (including the eBDN) before cast off.

FAQ 2.06 How are technical issues and system failures related to eBDN addressed and resolved during the bunkering process?

The main technical issues are due to firewall or network. The former can be resolved by providing the receiving vessel with sufficient time, before bunker delivery, to whitelist the domain/URLs. As for the latter, measures are put in place to ensure that the bunkering documentation workflow can be completed electronically in the event of poor network connectivity. For other technical issues or system failures, the Cargo Officer should contact the solution providers to assist in troubleshooting. Solution providers are dedicated to offering around-the-clock technical support to Cargo Officers, ensuring the resolution of any technical or usage issues encountered by users during the bunkering process.

FAQ 2.07 What measures are in place to ensure the accuracy and authenticity of the data entered into the eBDN by both the supplier and the receiver?

An example of the cybersecurity control measures put in place is the issuance of unique link and/or one-time password to the receiving vessel for every transaction by the service provider. The receiving vessel will access the Digital Bunkering Solution using the unique link and/or one-time password to complete the eBDN and related bunkering documentations electronically. Other forms of cyber security features available includes multi-factor authentication (MFA), secured electronic signatures and digital signatures.

Further cybersecurity control measures have also been implemented on the eBDN including locking the eBDN to prevent amendments after all parties have signed. A QR code is embedded for quick viewing and verification of the record. In addition, for full verification, the provided eBDN can be uploaded onto a record verification facility where the eBDN and its digital identity i.e., the hash value can be compared and verified against the originally generated record.

Additionally, similar to the current paper process, (a photo of) the bunker metering ticket will be provided to the receiving vessel.

FAQ 2.08 What technical specifications are required for the successful implementation of eBDN onboard vessels?

Different solution providers may have specific requirements that need to be verified. Ideally, the successful implementation of eBDN onboard vessels requires certain technical specifications to ensure compatibility and seamless operation. Key requirements include:

Email Address for Digital Company Stamp & E-Signature: To facilitate the eBDN implementation process, the ship is required to provide an email address, eBDN digital company stamp and e-signature required for verification and further proceedings.

Device Compatibility: Vessels should have computers, tablets, or mobile devices with modern web browsers and to ensure that such devices and web browsers are up to date and security patched.

Internet Connectivity: Reliability is essential for real-time communication and data transmission. Vessels should consider subscribing to Satellite communication packages with good max-info-rate and committed-info-rate, backup satellite communications, and/or 4G/5G coastal plans, etc.

Data Storage: Adequate storage capacity for storing eBDN records and related data.

Operating System: Devices should run on a supported and up-to-date operating system and to ensure that they are security patched.

FAQ 2.09 What backup systems are in place in case of technical failures during the eBDN transmission process?

Suppliers must ensure that the vessels receive the bunkering documentations (including the e-BDN) before cast off. Each eBDN solution provider has their own backup system in place for responding to technical failures. If the situation necessitates, the supplier could use the eBDN as the original record to generate the paper BDN

FAQ 2.10 How is the integrity of the data maintained throughout the eBDN process?

An example of the cybersecurity control measures put in place is the issuance of unique link and/or one-time password to the receiving vessel for every transaction by the service provider. The receiving vessel will access the Digital Bunkering Solution using the unique link and/or one-time password to complete the eBDN and related bunkering documentations electronically. Other forms of cyber security features available includes multi-factor authentication (MFA), secured electronic signatures and digital signatures.

Further cybersecurity control measures have also been implemented on the eBDN including locking the eBDN to prevent amendments after all parties have signed. A QR code is embedded for quick viewing and verification of the record. In addition, for full verification, the provided eBDN can be uploaded onto a record verification facility where the eBDN and its digital identity i.e., the hash value can be compared and verified against the originally generated record.

Additionally, similar to the current paper process, (a photo of) the bunker metering ticket will be provided to the receiving vessel.

FAQ 2.11 What happens if the next port state does not recognize, or has not recognized eBDN as an accepted document?

Vessels can print out the eBDN for port state inspection. Alternatively, port states can also reach out to the suppliers or MPA to verify the eBDN. MPA can be contacted at digitalbunker@mpa.gov.sg.

The Master may also refer to MEPC.1/Circ.795/Rev.8 on the Unified Interpretation of Regulations 18.5 of the Marpol Annex VI on the acceptance of the BDN either in hard copy or electronic format.

FAQ 2.12 What happens if financing parties do not recognize eBDN as an accepted document?

If financing parties require physical documentation, a hard copy of the Bunker Delivery Note (BDN) can be printed and submitted to financial institutions. This ensures compliance with their specific documentation preferences and facilitates traditional financial processes that may require physical records.

Financing parties can be guided by the FAQs addressed in Section 3.0 to ensure that the eBDN meets authenticity, legality and compliance requirements.

FAQ 2.13 Can the eBDN cater for additional comments, which must be approved once again by both signatory parties, after it has been signed off, in the event that an item on the eBDN has been incorrectly declared due to typo error?

If amendment is required, the signatures should be invalidated and re-signed. The Cargo Officer, Chief Engineer and Surveyor (if engaged) should check the information on the electronic bunkering documents before signing. Revocation of the eBDN is not allowed after cast off.

FAQ 2.14 How can related documents including Statement of Fact and Note of Protest be sent together with the eBDN?

Additional documents such as the Statement of Fact, Note of Protest, etc. can be completed electronically or uploaded onto the digital bunkering solution for issuance together with the rest of the bunkering documentations.

FAQ 2.15 Is the mass flow meter (MFM) data linked to the system and the final bunker amount transferred from bunker barge to vessel will be based on MFM data and not based on sounding or ullage from either bunker barge or vessel?

MPA is working with the industry to automate the data flow from the MFM to the digital bunkering solution. At this moment the BDN figure must follow the figure in the meter reading record form. Sounding in accordance with SS 600 is only permitted if the mass flow meter is unable to operate and with the specific one time approval of MPA. All deliveries in Singapore is based on mass flow meter figures as final and binding.

FAQ 2.16 How is Data from MFM transfer to eBDN currently in manual entry?

The digital bunkering solution retrieves the figures on the bunkering metering ticket via Optical Character Recognition (OCR). However, as OCR is not 100% accurate, the Cargo Officer will check the entries before confirming them into the eBDN document for signatures.

3.0 LEGAL / COMPLIANCE

FAQ 3.01 What are the legal regulations governing the use of eBDN in the bunkering industry? How does eBDN comply with international maritime laws and regulations?

IMO approved the use of eBDNs during the 80th meeting of its Marine Environment Protection Committee in 2023, via the issuance of an Unified Interpretation of Regulation 18.5 of MARPOL Annex VI promulgated via MEPC.1/Circ.795/Rev.8 on the acceptance of the BDN either in hard copy or electronic format.

FAQ 3.02 What happens if there is a dispute? How is liability determined if there are disputes regarding the quality or quantity of the delivered bunkers as stated in the eBDN?

Any dispute should be handled in accordance to SS648:2019 Annex AC - Resolution of Disputes.

FAQ 3.03 Are there any specific data protection laws that need to be adhered to when using eBDN?

Under Singapore jurisdiction, it will be Singapore's PDPA. Singapore's PDPA can be found here: <https://sso.agc.gov.sg/Act/PDPA2012>

FAQ 3.04 What legal implications are there if the eBDN is found to be tampered with or fraudulent?

The same legal penalty as the current paper BDN will apply.

FAQ 3.05 Who holds the liability in the case of errors or discrepancies in the eBDN data?

All signatories (i.e. Cargo Officer, Chief Engineer, and Surveyors) shall check the information on the eBDN before signing. The bunker suppliers and their digital bunkering solution providers, shall also put in sufficient measure to ensure that the data has not been modified after it has been signed.

FAQ 3.06 How is liability distributed between the cargo owner and the vessel owner in the case of disputes related to eBDN malfunction?

The terms of the contractual agreements between the cargo owner and the vessel owner play a significant role in determining liability. If the parties have a clear agreement regarding responsibilities and liabilities in the event of eBDN malfunction, those terms will be instrumental.

FAQ 3.07 What measures are in place to mitigate liability issues related to the use of eBDN?

The bunker supplier shall notify the bunker buyer on the use of eBDN, and if necessary, make provision for it in their contractual agreement. In addition, the bunker suppliers shall put in place measures to ensure the accuracy and integrity of the eBDN.

Parties could also seek legal advice from professionals with expertise in maritime law, electronic transactions, and data protection. Legal consultation can help identify potential liabilities and ensure compliance with relevant legal frameworks.

FAQ 3.08 What are the provisions for data retention and storage as per the legal requirements for eBDN?

In accordance with regulation 18 of Marpol Annex VI, the eBDN must minimally be retained for a period of three years after the fuel oil has been delivered on board.

Suppliers in this regards must also retain the eBDN for at least three years from the date of the delivery. This should form part of the QMBS requirement under SS 524.

FAQ 3.09 What are the legal implications of using electronic versus physical signatures on the eBDN?

Singapore has enacted the Electronic Transactions Act (ETA), which provides a legal framework for electronic transactions and the use of electronic signatures.

FAQ 3.10 What is the legal recourse if there is a dispute over the authenticity of the eBDN between the ship owner and the supplier?

Parties can follow the same legal process for disputes under the current paper based BDN system defined in SS648 and SS600 standards².

According to SS648 / SS600 standards², any discrepancies or forged documents should be reported to the relevant authorities, and legal action can be pursued if they are found to have violated the regulations.

FAQ 3.11 How are electronic contracts and agreements established and enforced within the eBDN framework?

Singapore has enacted the Electronic Transactions Act (ETA), which provides a legal framework for electronic transactions and the use of electronic signatures.

² Note: There will be a revision to SS648 in 2024 to add in sections relating to digital bunkering documents, and will revise when new standard is published.

FAQ 3.12 What happens if there are discrepancies between the physical bunker delivery on the receiving vessel and the information provided in the eBDN?

Similar with the current process, any dispute should be handled in accordance to SS648:2019 Section 10.8.6 under Disputes. Take note that the eBDN is a title transfer confirmation documentation that shows the verifiable completed transfer of bunker from supplier to buyer. It is a controlled activity under MPA's supervision and the eBDN is submitted to MPA instantly after completion of transaction.

FAQ 3.13 What liabilities are associated with the storage and management of eBDN data over the long term?

In the collaborative framework between the bunker supplier and solution provider, data security is paramount. Both parties must establish clear contractual agreements outlining responsibilities, including robust encryption and access controls. Collaborative long-term storage planning addresses data integrity, technology obsolescence, and regulatory compliance. A joint backup and disaster recovery strategy ensures data resilience, while monitoring changes in data protection laws remains crucial. Shared data deletion policies, technology updates, and a unified response to security incidents are essential for maintaining secure, accessible, and compliant e-Bunker Delivery Note (eBDN) data storage practices over time.

FAQ 3.14 How can parties be assured that they are being provided with an authentic copy of the eBDN?

An example of the cybersecurity control measures put in place is the issuance of unique link and/or one-time password to the receiving vessel for every transaction by the service provider. The receiving vessel will access the Digital Bunkering Solution using the unique link and/or one-time password to complete the eBDN and related bunkering documentations electronically. Other forms of cyber security features available includes multi-factor authentication (MFA), secured electronic signatures and digital signatures.

Further cybersecurity control measures have also been implemented on the eBDN including locking the eBDN to prevent amendments after all parties have signed. A QR code is embedded for quick viewing and verification of the record. In addition, for full verification, the provided eBDN can be uploaded onto a record verification facility where the eBDN and its digital identity i.e., the hash value can be compared and verified against the originally generated record.

Additionally, similar to the current paper process, (a photo of) the bunker metering ticket will be provided to the receiving vessel.

FAQ 3.15 What happens if there are discrepancies between the MFM & eBDN and the data submitted to MPA?

The bunker suppliers and their digital bunkering solution providers, must put in place measures to ensure consistency of data. The established protocol involves immediate system notification to the MPA, detailing the nature of the discrepancies and providing supporting documentation. This proactive reporting mechanism facilitates thorough investigation, resolution, and, if necessary, corrective actions to address any issues.

FAQ 3.16 How long do the eBDN records to be stored?

In accordance with regulation 18 of Marpol Annex VI, the eBDN must minimally be retained for a period of three years after the fuel oil has been delivered on board. Suppliers in this regards must also retain the eBDN for at least three years from the date of the delivery. This should form part of the QMBS requirement under SS 524.

4.0 PHYSICAL & CYBER SECURITY

FAQ 4.01 What happens in the event of a security breach?

In the event of a security breach, the immediate response is to prioritize the security and integrity of the system. As a precautionary measure, the affected system will be promptly shut down to prevent further unauthorized access and potential compromise of sensitive information.

During this period of system shutdown, bunker suppliers shall we will implement alternative measures to ensure the continuity of essential operations. One such measure involves issuing hard-copy Bunker Delivery Notes (BDN) to facilitate the bunkering process while the electronic system is being thoroughly assessed, secured, and restored. MPA shall also be informed in the event of security breach.

FAQ 4.02 How is the data encrypted and secured during the transmission of eBDN?

The transmission of eBDN data is secured through robust encryption measures to safeguard its confidentiality and integrity. eBDN solution providers are expected to provide industry-standard encryption protocols, such as TLS (Transport Layer Security) or SSL (Secure Sockets Layer), ensuring end-to-end encryption during data transmission.

FAQ 4.03 What cybersecurity protocols are in place to protect the eBDN data from potential threats and vulnerabilities?

Additionally, as part of the MPA's whitelisting requirements, digital service providers are required to obtain ISO 27001 certification (or equivalent) and conduct cybersecurity assurance testing such as vulnerability assessment and penetration testing (VAPT) to identify and address any cyber security weaknesses within the system.

FAQ 4.04 How is liability handled if the eBDN is compromised due to cyber-attacks or data breaches?

It is important to note that liability considerations are typically outlined in the terms and conditions governing the use of the eBDN platform between the solution provider and the bunker supplier. Users are encouraged to review and adhere to these terms, which often include provisions specifying the responsibilities of both parties in the event of a security incident.

Furthermore, regular training and awareness programs are conducted to educate users on cybersecurity best practices, fostering a proactive approach to risk mitigation.

FAQ 4.05 What are technical guidelines for firewalls, email domain etc.?

The minimum specifications for firewalls, email domains, and related security protocols typically include:

- 1. Firewall Configuration:** Utilise a firewall with stateful packet inspection capability, supporting granular access control lists (ACLs) and intrusion detection/prevention features.
- 2. Email Domain Setup:** Implement SPF (Sender Policy Framework), DKIM (DomainKeys Identified Mail), and DMARC (Domain-based Message Authentication, Reporting, and Conformance) to authenticate emails and prevent spoofing.
- 3. Encryption Standards:** Ensure Transport Layer Security (TLS) encryption is enabled for email communication to protect data in transit.
- 4. Access Control Policies:** Define and enforce access control policies to restrict unauthorised access to network resources and sensitive data.
- 5. Regular Updates and Patch Management:** Keep firewall firmware, email server software, and related security components up to date with the latest patches and security updates to address vulnerabilities.
- 6. Logging and Monitoring:** Enable logging and monitoring mechanisms to track network traffic, firewall events, and email activity for security analysis and incident response.
- 7. Backup and Disaster Recovery:** Implement regular backups of firewall configurations and email data to facilitate quick recovery in case of system failures or security breaches.
- 8. Compliance Requirements:** Ensure compliance with relevant regulatory standards and industry best practices, based on organisational needs.

These specifications serve as a baseline for establishing a secure network infrastructure and protecting against common cyber threats. Additional measures may be necessary depending on the specific requirements and risk profile of the organisation.

For firewall solutions, there are several reputable providers in the market, each offering different features and capabilities to meet various security needs. Some of the well-known firewall providers are CISCO, FORTINET, SOPHOS etc.

5.0 CONTINGENCY / BUSINESS CONTINUITY PLANNING

FAQ 5.01 How does the eBDN process align with local customs and import/export regulations?

The process of providing documents to clear customs and comply with import/export regulations remains unchanged, as the Bunker Delivery Note (BDN) can be printed and verified as needed.

FAQ 5.02 What steps are taken to ensure that eBDN does not cause delays in the bunkering process?

Bunker suppliers shall ensure that the Cargo Officers are well trained in the use of the eBDN application, and to provide support to the receiving vessel if necessary. Ship Owner/ manager/ charterers could also brief the ship crew in advance on the implementation of eBDN in Singapore .

6.0 ADOPTION / FUNDING

FAQ 6.01 How does the adoption of eBDN impact the overall efficiency of bunkering operations?

It improves efficiency and productivity by streamlining bunkering processes and automating routine tasks. Additionally, it allows ease of sharing of bunkering documentations between the stakeholders in the supply chain ecosystem

FAQ 6.02 What training is provided to the personnel involved in the handling and processing of eBDN?

The eBDN workflow is designed to be simple, straightforward and mimic current processes. Minimal training is required for personnel involved in handling and processing of the eBDN. An electronic copy of the user guide will be furnished for cargo officers, chief engineers, and surveyors. Necessary training will be provided by the solution provider which will also include providing necessary training materials to the receiving vessel crews.

FAQ 6.03 How does eBDN impact the workflow and documentation processes of bunkering operations?

The cargo officer, Chief Engineer and Surveyor (if engaged) are required to login to the eBDN application to complete the eBDN and related bunkering documentations via a tablet provided by the bunker supplier. Upon completion, the documents are shared with these parties electronically via the agreed email address and QR code.

FAQ 6.04 How does eBDN affect the record-keeping and audit processes for bunkering operations?

With eBDN, the entire bunkering documentation process, from initiation to completion, is digitized, where the sequence of activities are captured and recorded as part of the digital audit trail. The eBDN system allows for quick and easy retrieval of bunker-related data.

Different solution providers may have specific measures that need to be verified. Ideally, all electronic records and documents processed will be stored within individual customer databases on solution providers' cloud platform. Customers determine the retention period, aligning with regulatory requirements and company policies. Additionally, application logs are provided, capturing crucial user activities for each bunkering job. These logs serve to support the audit process and investigations.

FAQ 6.05 What is the cost implication of eBDN services?

The cost incurred by the bunker suppliers and/or barge operators includes the tablet/laptop/PC, software cost (i.e. one-time set up fee and monthly subscription for the eBDN application) and network infrastructure and subscription cost.

For the receiving vessel, the requirements can be found in FAQ 2.08. Cost needed will be dependent on what hardware/software is not available.

FAQ 6.06 What is the pricing structure for the eBDN service?

- One-time Setup Fee:
 - Technology provider may charge a one-time setup fee of less than USD 10,000 per barge.
- Monthly Subscription:
 - There is a recurring monthly subscription fee per barge

Do take note that this is subject to commercial arrangement between the technology provider and the bunker tanker Owner/Cargo Owner.

FAQ 6.07 What does receiving vessel owner required to do to support eBDN bunker delivery?

In addition to the technical requirements elaborated in Item 2.08, vessels may be required to whitelist the domains/URLs of the digital bunkering solutions in order to access and complete the electronic documents.

Receiving vessel owners could brief or upskill the Chief Engineer/ Ship's crew on digital bunkering system processes and issuance of bunkering documentations electronically in Singapore.

FAQ 6.08 What are the various incentives available to support eBDN implementation for bunker suppliers, and barge operators?

MPA has worked with Enterprise Singapore, Workforce Singapore, and National Trades Union Congress to support the eBDN implementation. Please refer to the following links for more information:

<https://www.enterprisesg.gov.sg/financial-support/enterprise-development-grant>

<https://www.wsg.gov.sg/home/individuals/attachment-placement-programmes/career-conversion-programmes-for-individuals>

<https://www.ntuc.org.sg/uportal/programmes/company-training-committee-grant>

FAQ 6.09 What is the deadline to apply for the funding support?

Funding support is also aimed at driving early adoption of the solutions. ESG EDG grant is extended to Aug 2024. This means that submissions must be complete, where all fields are correctly filled, and all relevant and necessary supporting documents have been submitted. As funding support is limited, applications will be considered on a first-come-first-served basis.

FAQ 6.10 Is the funding support guaranteed?

Each grant application will be assessed by the respective funding agency. Companies can check with the respective funding agency directly for their grant application status.

FAQ 6.11 Can I apply for the funding support more than once?

It is subject to the processing turnaround time of each funding agency. Typically, grant application review can commence once the funding agency have received a complete grant application form with all supporting documents properly furnished. We recommend that you study the application requirements of each grant carefully before submitting your grant application.

FAQ 6.12 How long will it take to process my grant application?

It is subject to the processing turnaround time of each funding agency. Typically, grant application review can commence once the funding agency have received a complete grant application form with all supporting documents properly furnished.

We recommend that you study the application requirements of each grant carefully before submitting your grant application.

FAQ 6.13 I have already signed a contract with my solution vendor. Am I still eligible for any support?

Support under CCP and NTUC’s CTC grant can be tapped on for the upskilling needs of your workforce relating to digital bunkering.

For EDG, it only applies to new projects that have not commenced prior to grant application i.e. no contractual agreement were signed before submitting an application. Nonetheless, digital bunkering has further phases in the pipeline. MPA will continue to explore availability of support for future implementation, such as the NTUC CTC Grant.

FAQ 6.14 Where can I get more information from the solution vendors?

Name	Organisation	Contact email
Ms. Eunice Low	ADP Clear	info@adpclear.io
Mr. Ang See Lin	Angsana Technology	slang@angsanatech.com
Mr. Goh Kwong Heng	BTS / ZeroNorth	kwongheng.goh@zeronorth.com
Mr. Leon Ling	Bunkerchain	leonling@bunkerchain.io

Disclaimer:

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It is important to note that specific regulations and requirements may vary by jurisdiction, and users are encouraged to seek independent professional advice tailored to their specific circumstances.

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ANNEX A

MPA document on Digital Bunkering



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← Bunkering



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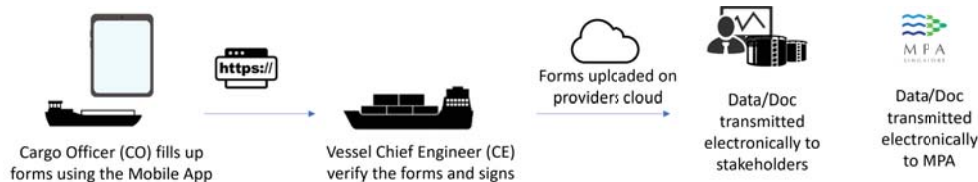


Digital Bunkering

Overview of Digital Bunkering initiative

In Jul 2023, IMO has formally confirmed that bunker deliver notes (BDNs) are acceptable in either hard copy or digital form – refer to the [MEPC.1/Circ.795/Rev.8](#) for the Unified interpretations to MARPOL Annex VI.

Digital Bunkering initiative seeks to digitalise bunkering processes and documentations such as electronic bunker delivery note (eBDN), bunker requisition form, checklists, and other forms. The objectives are to: **(1) improve efficiency and productivity** by streamlining bunker processes and automating routine tasks, **(2) increase transparency** by providing greater visibility on operations and ensuring information integrity, and **(3) enhance crew safety** by reducing physical movements between vessels. It also automates Business-to-Government regulatory reporting, where key bunkering-related information will be sent to MPA automatically after every bunkering operation.



A new Specification for digital bunkering supply chain documentation is expected to be published in Q1 2024 to enable standards and interoperability between different systems. In addition, the Singapore Standard Code of Practice for Bunker Mass Flow Metering (SS648:2019) will be revised to incorporate digital bunkering workflow and processes.

Implementation Plan

From 1st November 2023, bunker suppliers can start issuing electronic bunker delivery note (eBDN) and bunkering documentation required under the Singapore Standard (SS 648 – Code of Practice for Bunker Mass Flow Metering) through the digital bunkering solutions whitelisted by MPA. Please also refer to the [Port Marine Circular \(No. 12 of 2023\)](#) for the guidelines for bunker craft operators and suppliers and the vessels receiving bunker.

MPA will require all bunkering operations in Singapore to go digital (i.e., use electronic processes and documentation) after this initial period, which will be announced at a later date. MPA will also be exploring further enhancements, such as the use of smart data logger and transmission of Mass Flow Meter (MFM) profile.

The implementation of Digital Bunkering solutions is an opportunity for business transformation. MPA is working with Enterprise Singapore and Workforce Singapore to support companies on their transformation journeys.

Whitelisted Digital Bunkering solutions

MPA whitelists Digital Bunkering solutions to ensure conformance to bunkering standards, cybersecurity, baseline functionality, risk management and regulatory reporting requirements .

Bunker craft operators and suppliers can reach out to the solution providers below to find out more about the whitelisted Digital Bunkering solutions. This is a preliminary list which will be updated further as more solution providers get whitelisted or delisted.

Solution Provider	Contact details	Solution name	Email domain(s)/URL(s) to allow access to the digital bunkering solution(s)
Angsana Technology Pte. Ltd. (Effective 1 Nov 2023)	Ang See Lin (slang@angsanatech.com)	BunkerFlow	Email domain: bunkerflow.io URL: *.bunkerflow.io
ZeroNorth (BTS Pte. Ltd.) (Effective 1 Nov 2023)	Goh Kwong Heng (kwongheng.goh@zeronorth.com) Dharma Reddy (sreenivas.dharma@zeronorth.com)	digitalBunkering@Sea	Email domain: zeronorth.com URL: *.digitalbunkering.app
Bunkerchain Pte. Ltd. (Effective 1 Nov 2023)	Vance Loh (vance.loh@bunkerchain.io) Leon Ling (leon.ling@bunkerchain.io)	Touch and Sail (non MVP version)	Email domain: bunkerchain.io URL: *.touchandsail.bunkerchain.io
ADP Clear Pte. Ltd. (Effective 1 Jan 2024)	Jaqueline Tomasini (Jaqueline.tomasini@adpclear.io) Simon Lock (Simon.lock@adpclear.io)	Advanced Delivery Platform	Email domain: adpclear.io URL: *.adpclear.io

MPA shall not be responsible or liable for any expenses, losses or damages incurred by, or action taken against, the user(s) of whitelisted solution(s). Users, including bunker suppliers, bunker craft operators, surveyors, and bunker buyers, are required to conduct its own due diligence before adopting any whitelisted solution(s).

Click [here](#) for the Frequently Asked Questions. For any other queries, you may contact DigitalBunker@mpa.gov.sg.

Click [here](#) for information on the Digital Bunkering Call for Proposals that was launched in 2021.

Port Marine Circular on Digital Bunkering FAQs

Implementation/ Operations

1. What is the implementation timeline for Digital Bunkering?

MPA has announced the implementation of digital bunkering starting 1 November 2023, with a plan to make it mandatory by around end 2024. All MPA licenced bunker suppliers and craft operators are strongly encouraged to adopt digital bunkering early, for the familiarisation of the cargo officers and crew. The Annex of PMC (No. 12 of 2023) provides the guidelines for the use of digital bunkering service for the bunker supplier, bunker craft operator and vessel receiving bunkers.

2. For suppliers that adopt Digital Bunkering, do they still require to manually update bunker sales volume? If yes, when will MPA stop manual reporting?

MPA will work closely with the supplier on the transition to Digital Bunkering to automate the reporting of bunker sales volume. Manual reporting via digitalPORT@SG™ portal will be required for instances where a supply could not be reported via Digital Bunkering. Suppliers are strongly encouraged to adopt digital bunkering early to familiarise the crew/customers well before mandatory implementation and enjoy its benefits.

3. Will the suppliers be required to submit data for loading and ship-to-ship in addition to delivery operation?

There is no need to submit such data at this moment. MPA will work with the bunkering stakeholders to work on the timeline for the submission of loading and Ship-to-Ship data in due course. Nevertheless, the whitelisted digital platforms will have provisions to cater for these data and the suppliers can also utilise the platform to further digitalise their inhouse system.

4. Who is supposed to procure, install, subscribe, and maintain the digital solutions?

It will be the bunker supplier's responsibility to ensure eBDN issuance, including all necessary SS648 bunkering documentation. Monthly bunker sales volume information is also required to be submitted to MPA by the suppliers. MPA will not be a party to any commercial discussions between the suppliers, craft operator, digital solution providers or any other stakeholders.

5. Which digital bunkering solutions can be implemented in Singapore?

Only the MPA-whitelisted digital bunkering solutions can be implemented in Singapore. The list of whitelisted solutions is available at <http://www.go.gov.sg/digital-bunkering> which will be updated as solutions get whitelisted or delisted.

6. Can hard copy BDN be issued to vessel?

Bunker suppliers can still issue paper BDN until digital bunkering is made mandatory. However, suppliers are strongly encouraged to adopt digital bunkering early to familiarise

the crew/customers well before mandatory implementation and enjoy the benefits. Suppliers that adopted digital bunkering solution will not be required to issue physical BDN. However, if customer insists on paper BDN or where situation necessitate, supplier could use the eBDN as the original record to generate the paper BDN. Bunker suppliers that implemented digital bunkering solutions should encourage and inform their customers on the use of eBDN.

7. Is it required for our Cargo Officer to go onboard the receiving vessel to do the necessary paperwork?

For suppliers that have implemented digital bunkering solution, cargo officers are not required to go onboard the receiving vessel for bunkering paperwork, as the unique link and/or password will be sent to the receiving vessel for the Chief Engineer/Master to complete the bunkering documentation electronically.

8. What is the process of approval for installing digital bunkering solution onboard a bunker tanker?

The digital bunkering solutions are mobile and web-based applications and can be accessed using internet-enabled devices that are secured and patched, i.e., laptop, computer, tablets, handphones, etc. However, barge operators must ensure that installation of any internet devices onboard as necessary must be in accordance with applicable flag/class rules. MPA must be updated on the suppliers and the barges that have been upgraded for digital bunkering and the service provider. No modification of the MFM or the MFM system is normally required for the installation of digital bunkering solution. However, in the event it is required, it must be done only with MPA's approval.

9. What should the supplier/craft operator do in the event where the customer, Master/Owner refuse to accept the eBDN or participate in Digital Bunkering?

The supplier/craft operator shall engage and inform the customer and Master/Owner in advance regarding the conduct of digital bunkering and the issuance of electronic documents. The Port Marine Notice on digital bunkering could be presented to the customer and Master/Owner to inform them on Singapore's implementation of digital bunkering.

10. Would MPA's approval be required for the change of digital solution provider?

MPA's approval is not required for the change of whitelisted digital solution providers. However, MPA should be informed.

11. What are the procedures required for the update/upgrade of the digital system?

Solution providers must inform MPA prior to the update/upgrade of their digital system. The list of system changes shall be provided to MPA for approval.

12. How will the B2G reporting be transmitted to MPA and how will we know that it has been successfully transmitted?

The B2G reporting, along with the status of transmission, will be available via the digital bunkering solution.

13. How will the vessel and surveyor receive a copy of the eBDN?

The eBDN, together with the related bunkering documentations, will be transmitted to the vessel and surveyor via email and/or downloaded directly from eBDN solution.

14. How long must the supplier and receiving ship retain the eBDN?

In accordance with regulation 18 of Marpol Annex VI, the eBDN must minimally be retained for a period of three years after the fuel oil has been delivered on board. Suppliers must also retain the eBDN for at least three years from the date of the delivery. This should form part of the quality management system for the bunker supply chain (QMBS) requirement under SS 524.

15. What are the measures in place to ensure information security?

The digital service provider whitelisted by MPA must have ISO 27001 certification (or equivalent) and conduct cybersecurity assurance testing such as vulnerability assessment and penetration testing (VAPT), that would identify and address cyber security weaknesses within its system. In addition, the digital bunkering solutions offered by the provider must comply with all applicable laws (i.e., the Electronic Transactions Act (Chapter 88)), regulations, standards, and guidelines in Singapore.

Bunker suppliers/ craft operators should also conduct security risk assessment and due diligence on the selected solution(s) and vendor(s) based on its own operating environment, requirements and specific implementation which vary from company to company.

Standards Development

16. Will digital bunkering be incorporated into Singapore standards for bunkering?

The revision of the existing SS648:2019 Code of Practice of Bunker Mass Flow Metering is being developed by the industry-led Singapore Standards Council to support electronic bunkering documentation and is expected to be completed in 2024. A new Specification for Digital Bunkering Supply Chain documentation is expected to be published in 2024 to enable standards and interoperability across different systems.

Support for Companies

17. What support is available for the adoption of digital bunkering? How do we apply for such support?

MPA is committed to supporting companies seizing this opportunity to transform. We are working with Enterprise Singapore, Workforce Singapore, and National Trades Union Congress to support you on this digitalisation journey.

Career Conversion Programme for Sea Transport Professionals and Associates

Digital bunkering offers you an opportunity to reskill your current workforce who are Singaporeans or Permanent Residents. These could include both officers onboard the vessels, and onshore staff. For instance, cargo officers may need to pick up basic digital skills, perform first-level trouble shooting onsite, and understand cybersecurity concepts to perform their new role competently. Onshore, the reduction in data entry work relating to bunkering can free up administrative personnel to be reskilled to perform other roles in the company.

The Career Conversion Programme (CCP) for Sea Transport Professionals and Associates supports the reskilling of workers to enable technology adoption and accelerate business transformation. It provides salary support for workers for up to 3 months. Depending on the age of the worker, the salary support levels are:

- Standard rate: 70% of monthly salary, capped at S\$4,000/month.
- Enhance rate for local trainees 40 years old and above: Up to 90% of salary, capped at S\$6,000/month.

You can visit <https://www.wsg.gov.sg/home/individuals/attachment-placement-programmes/career-conversion-programmes-for-individuals> for more information on eligibility criteria and application guidelines.

NTUC Company Training Committee Grant

The NTUC Company Training Committees (CTCs) grant supports companies to implement transformation plans that would lead to better worker and business outcomes. Both unionised and non-unionised entities can work with NTUC to form a CTC.

Companies can engage NTUC's e2i at www.e2i.sg/ctcqueries on their project applications, and the exact areas of support, before submission.

Please visit <https://www.ntuc.org.sg/uportal/programmes/company-training-committee-grant> for more information on eligibility criteria and application guidelines.

Enterprise Development Grant

Finally, companies can also tap on whole-of-government funds to support their adoption of digital bunkering solutions. The Enterprise Development Grant (EDG) is one such resource. EDG supports projects that help businesses upgrade, innovate, grow and transform, and funds up to 50% of eligible costs for local small and medium enterprises (SMEs).

Company must have at least 30% local equity held directly or indirectly by Singaporean(s) and/or Singapore PR(s), determined by the ultimate individual ownership; is financially ready to start and complete the project (Commonly used financial indicators, such as the

current ratio, will be used for assessment.); and the business entity must be registered and operating in Singapore.

Projects must be new, have not commenced, and are not generating any revenue at the point of grant application. In addition, only the first digital solution deployment per vessel is eligible for grant consideration.

Please visit <https://www.enterprisesg.gov.sg/financial-support/enterprise-development-grant> for more information on eligibility criteria and application guidelines.

18. What is the deadline to apply for the funding support?

Funding support is aimed at driving early adoption of the solutions.

All applications for EDG must be submitted in full by 31 Mar 24. This means that submissions must be complete, where all fields are correctly filled, and all relevant and necessary supporting documents have been submitted. As funding support is limited, applications will be considered on a first-come-first-served basis.

For CCP – Job Redesign Reskilling (JRR), this is an ongoing programme and companies are required to have their applications approved before they can commence On-The-Job Training. Therefore, companies are encouraged to send in their applications to WSG at least 1 to 2 months before the targeted commencement date.

19. Is the funding support guaranteed?

Each grant application will be assessed by the respective funding agency. Companies can check with the respective funding agency directly for their grant application status.

20. Can I apply for the funding support more than once?

At the vessel-level, funding support under EDG is applicable only for the first solution installed for each vessel. Companies intending to install more than one digital bunkering solution on your vessel will have to bear full cost for any additional installations on the same vessel.

At the fleet-level, funding support is capped at 10 vessels per company. Similarly, funding support is also limited to the first solution installed for each vessel.

Companies should only apply to EDG once for digital bunkering. If the solution installed across your fleet is different, companies must include the details of their various installations in a single application for EDG.

For the CCP – JRR, companies can apply for the funding support more than once, so long as the employees in each application are different.

21. How long will it take to process my grant application?

It is subject to the processing turnaround time of each funding agency. Typically, grant application review can commence once the funding agency have received a complete grant application form with all supporting documents properly furnished.

We recommend that you study the application requirements of each grant carefully before submitting your grant application.

22. I have already signed a contract with my solution vendor. Am I still eligible for any support?

Support under CCP and NTUC's CTC grant can be tapped on for the upskilling needs of your workforce relating to digital bunkering.

For ESG Enterprise Development Grant (EDG), it only applies to new projects that have not commenced prior to grant application i.e., no contractual agreement was signed before submitting an application.

Nonetheless, digital bunkering has further phases in the pipeline. MPA will continue to explore availability of support for future implementation, such as the NTUC CTC Grant.



MARITIME AND PORT AUTHORITY OF SINGAPORE

PORT MARINE CIRCULAR
NO. 12 OF 2023

27 October 2023

Bunker Suppliers / Bunker Craft Owners and Operators
Bunker Surveyors
Harbour Craft Community
Shipping Community

DIGITAL BUNKERING

This circular serve to inform the community that digital bunkering¹ will commence in the Port of Singapore from 1st November 2023.

2 From 1st November 2023, bunker suppliers can start issuing electronic bunker delivery note (eBDN)² and bunkering documentation required under the Singapore Standard (SS 648 – Code of practice for bunker mass flow metering) through the digital bunkering solutions whitelisted by MPA. Please refer to **Annex A** for a sample eBDN issued in Singapore (for illustration purposes only).

3 MPA has whitelisted the digital bunkering solutions to ensure conformance to bunkering standards, cybersecurity, baseline functionality, risk management and regulatory reporting requirements. The list of whitelisted³ solutions is published on MPA website ([link](#)) and will be progressively updated as new digital bunkering solutions become available.

¹ This involves the use of electronic bunkering processes and documentation, such as electronic bunker delivery notes (e-BDNs) and automatic sharing of bunkering-related information with MPA.

² MEPC 80, approved a Unified Interpretation (UI) to regulations 18.5 and 18.6 of MARPOL Annex VI promulgated via MEPC.1/Circ.795/Rev.8. This makes clear that the Bunker Delivery Note (BDN) required by regulation 18.5 is acceptable in either hard copy or electronic format provided it contains at least the information specified in appendix V to MARPOL Annex VI and is retained and made available on board in accordance with regulation 18.6. In addition, an electronic BDN should be protected from edits, modifications or revisions and authentication be possible by a verification method such as a tracking number, watermark, date and time stamp, QR code, GPS coordinates or other verification methods.

³ MPA shall not be responsible or liable for any expenses, losses or damages incurred by, or action taken against, the user(s) of whitelisted solution(s). Users, including bunker suppliers, bunker craft operators, surveyors and bunker buyers, are required to conduct its own due diligence before adopting any whitelisted solution(s).

4 MPA will require all bunkering operations in Singapore to go digital (i.e., use electronic processes and documentation) after this initial period, which will be announced at a later date. As such all MPA licenced bunker suppliers and craft operators are strongly encouraged to adopt digital bunkering at the earliest possible, for the familiarisation of the cargo officers and crew. Please see **Annex B** which provides the guidelines for the use of digital bunkering service for the bunker supplier, bunker craft operator and the vessel receiving bunkers.

5 The adoption of digital bunkering will increase efficiency of bunkering operations in the Port of Singapore. The MPA will continue to explore and work with the industry on other enhancements, including automating the data flow from Mass Flow Meters.

6 Should you have any queries, please write to us at bsd@mpa.gov.sg or digitalbunker@mpa.gov.sg.

CAPT DAKNASH GANASEN
SENIOR DIRECTOR (OPERATIONS & MARINE SERVICES)
for CHIEF EXECUTIVE
MARITIME AND PORT AUTHORITY OF SINGAPORE

SAMPLE ELECTRONIC BUNKER DELIVERY NOTE

Attachments X

Name ^

- bdn.json
- bdn_schema.json

Bunker supplier's Letterhead including licence number

Sample

BMT NO: 1676 BDN NO: BDN-09675

BUNKER DELIVERY NOTE

Delivery port	: SINGAPORE	Date of operation	: 28-Apr-2023
Delivery location	: P17	Vessel's name	
Bunker tanker's name		Vessel's IMO no.	
SB no.		Gross tonnage	
Alongside vessel (Date / Time)	: 28-Apr-2023 09:45:00	Owner/Operator	: MASTER/OWNER
Commenced pumping (Date / Time)	: 28-Apr-2023 11:00:24	ETD	: 30-Apr-2023
Completed pumping (Date / Time)	: 28-Apr-2023 18:14:24	Next port	: China
Delivery type	: 1 - SS448	Supply type	: I - International

Ship-To-Ship Transfer

PRODUCT SUPPLIED

COO report number			
Product name	MFO380	Flash point °C (ISO 2719)	75
Viscosity at 40 °C, mm ² /s (ISO 3104)	305.9	Sulphur content, % m/m (ISO 14596 or ISO 8754)	3.27
COO density at 15°C(kg/m ³) (ISO 3675 or ISO 12185)	0.9811	Metric tons delivered	2297.008
Water content % V/V (ISO 3733)	0.45		

SUPPLIER'S DECLARATION	MASTER'S / CHIEF ENGINEER'S ACKNOWLEDGEMENT																												
Declaration that bunker fuel supplied conforms with MARPOL Annex VI We declare that the bunker fuel supplied conforms with Regulation 18.3 of this Annex and that the sulphur content of the fuel of supplied does not exceed. Please mark (x) in the applicable box(es) below	We acknowledge receipt of the above product and confirm its intended use and that the following samples were jointly taken by the continuous drip sampler at the vessel's manifold, sealed and numbered:																												
<input type="radio"/> the limit value given by regulation 14.1 of this annex	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.7em;"> <tr> <th>Seal no.</th> <th>Counter seal no. (if any)</th> </tr> <tr> <td> </td> <td> </td> </tr> </table>	Seal no.	Counter seal no. (if any)																										
Seal no.	Counter seal no. (if any)																												
<input type="radio"/> the limit value given by regulation 14.4 of this annex, or	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.7em;"> <tr> <td> </td> <td>Vessel</td> </tr> <tr> <td> </td> <td>Bunker tanker</td> </tr> <tr> <td> </td> <td>Bunker tanker</td> </tr> <tr> <td> </td> <td>Surveyor</td> </tr> <tr> <td> </td> <td>Others (To specify)</td> </tr> </table>		Vessel		Bunker tanker		Bunker tanker		Surveyor		Others (To specify)																		
	Vessel																												
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<input checked="" type="radio"/> the purchaser's specified limit value of 3.5 (% m/m), as completed by the fuel oil supplier's representative and on the basis of the purchaser's notification that the fuel oil is intended to be used: 1. in combination with an equivalent means of compliance in accordance with Regulation 4 of this Annex, or 2. is subject to a relevant exemption for a ship to conduct trials for sulphur oxides emission reduction and control technology research in accordance with Regulation 3.2 of this Annex.	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.7em;"> <tr> <th colspan="2">CUSTOMER FEEDBACK</th> </tr> <tr> <td colspan="2">The following rating is satisfaction level of the bunkering operation (Please Tick)</td> </tr> <tr> <td style="text-align: center;"> <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input checked="" type="radio"/> 5 </td> <td style="text-align: right; font-size: 0.6em;"> Very Unsatisfied Very Satisfied </td> </tr> <tr> <td colspan="2">Acknowledge By</td> </tr> <tr> <td style="width: 50%; height: 40px;"> </td> <td style="width: 50%; height: 40px;"> </td> </tr> </table>	CUSTOMER FEEDBACK		The following rating is satisfaction level of the bunkering operation (Please Tick)		<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input checked="" type="radio"/> 5	Very Unsatisfied Very Satisfied	Acknowledge By																					
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- Security features include: (1) locked to protect from edits, (2) QR code for manual verification, and (3) electronic verification via a verification facility.
- The eBDN also contains an attachment with machine readable/ interpretable data file, conforming to standardised formats and semantics, to enable interoperability by different IT systems.

GENERAL GUIDELINES FOR BUNKER SUPPLIERS & BUNKER CRAFT OPERATORS

For a smooth and efficient transition into digital bunkering, bunker suppliers and bunker craft operators should adopt the following measures:

- I. Equip the barges with reliable internet connection on board, e.g., 5G/4G/LTE antenna, Satcomm, etc. The barges may also share their Wi-Fi hotspot with the receiving vessel if required.
- II. Provide sufficient training for the cargo officer. i.e., usage of the whitelisted digital bunkering solution(s) to complete the bunkering workflow and documentation electronically.
- III. Inform the customer, Master / Owner of the receiving vessel and surveyor, if engaged, in advance on the issuance of bunkering documentations electronically. This is to provide sufficient time for the receiving vessel to access the domain/URL(s) and receive emails with hyperlinks from whitelisted digital bunkering solution(s), and also prepare their electronic vessel/ company stamp.
- IV. A user manual should be prepared and provided to the crew of the vessel receiving bunkers to explain the use of the digital platform smoothly.

GENERAL GUIDELINES FOR VESSELS RECEIVING BUNKER

The receiving vessel should adopt the following measures:

- I. **Corporate ICT Policy**
 - a. Whitelist the domain/URL(s) and email sender to allow access to the digital bunkering solution(s), and prepare the electronic vessel stamp⁴ in advance for uploading.
 - b. Provide the Chief Engineer a device/computer with internet access during the port stay in Singapore.
- II. **Infrastructure and network**
 - a. Provide reliable network on-board, e.g., subscribe to satellite communications packages with good max-info-rate and committed-info-rate, backup satellite communications, 4G/5G coastal plans, etc. Alternatively, the receiving vessel may also

⁴ The electronic vessel stamp can be prepared by capturing an image (scanned/ photograph) of the stamp and uploading it onto the device/computer which the Chief Engineer would be using to access the digital bunkering solution(s).

request to tap on Wi-Fi hotspot if available, from the bunker barge's representative or bunker surveyor (if engaged).

- b. Carry out technology updates to ensure periodic refresh of IT assets, equipment and infrastructure.
- c. Ensure that the web browsers are up to date and security patched.
- d. IT system maintenance to be planned to minimise disruption of transmission during the bunkering operation, as it could impact smooth transmission of data and documents between the bunker barge and the vessel receiving the bunkers.

III. **Human factors**

- a. Brief the Chief Engineer/ ship's crew on digital bunkering system processes and issuance of bunkering documentations electronically in Singapore.

ANNEX B

White-listed eBDN solution providers Info-Pack

THE ADVANCED DELIVERY PLATFORM

INTRODUCING ADP

The Advanced Delivery Platform (ADP) is an integrated hardware and software solution that provides a **completely transparent and efficient** bunker delivery service, reducing cost and risk.



Unlock the **power of the data** your business is generating in its daily activities in **reporting dashboards** for your operations, sales teams and for your customers.

SERVICE TIERS ON THE BARGE



ADP ULTRA LITE: Connect to a **cloud-based ADP application** for rapid set-up with no hardware needed.



ADP LITE: The bunker barge emits a **local WiFi network** used by the crews to ensure you never fallback to paper.



ADP FULL: Is **integrated with the MFM** to add unparalleled efficiency and transparency.

Feature	Ultra-lite	Lite	Full*
Barge load and delivery schedule	✓	✓	✓
eBDN solution (MPA whitelisted)	✓	✓	✓
Full offline capabilities		✓	✓
MFM delivery profile			✓
24/7/365 support team	✓	✓	✓

*Available globally and coming soon to Singapore!

BunkerFlow

The only **fully independent** solution in the market, built for the **privacy conscious**.

We empower the bunkering industry to increase profitability and efficiency through a world-class bunkering workflow management system.

Key Features



Offline-Ready

No internet? Use our system without fretting. Work done will be synced when you are back online.



Multi-Platform

Compatible with Android, iOS, Mac, Windows and Linux.



Secure System

Your privacy and data security is our top priority.



Secured Electronic Signature

BunkerFlow fully complies to the Electronic Transaction Act by implementing full access controls to each user, even when offline.



Contactless Smart Forms

Highly-customisable with dynamic content, allowing auto-completion with minimal user intervention.



Verifiable Documents

Easily share documents that are verifiable for authenticity and integrity, through the powers of blockchain.



Angsana Technology Pte Ltd is a software company providing digitalisation solutions for the maritime industry. Angsana's BunkerFlow is one of the first solutions to obtain MPA's whitelisting for the Digital Bunkering Project.

Why BunkerFlow?

Independent Technology Entity

We protect your business interest by being free from affiliation with any organisations or entities.

Proven Solution

Our solution has undergone numerous successful live trials with four bunker operators of all scales, encompassing both international and domestic bunker deliveries. Additionally, we've achieved two successful joint trials in collaboration with ONE, Shell, and Hong Lam Marine.

Proudly Local

BunkerFlow is fully designed, built and supported in Singapore, by Singaporeans.



Electronic Bunker Delivery Note (eBDN)

DIGITALIZING BUNKERING DOCUMENTATION

ZeroNorth Bunker's eBDN solution is streamlining bunker documentation with digital precision & transparency. Bunker procurement has traditionally been a cumbersome process involving multiple stakeholders, burdened by manual documentation and a host of complexities. The ZeroNorth electronic Bunker Delivery Note (eBDN) software, a modern solution that eliminates manual processes, streamlines documentation, and propels the industry into a paperless era.

KEY FEATURES

- ✓ **Effortless Documentation:** no more manual paperwork.
- ✓ **Instant Information Sharing:** Real-time delivery information exchange.
- ✓ **Eliminating Data Errors:** Drastically reduces inaccuracies and re-issuance.
- ✓ **Compliance with Regulations:** Seamlessly aligns with Port Authority's bunkering procedures and requirements in documents and data submission.
- ✓ **Enhanced Efficiency:** Aims to save up to 50% of time previously spent on manual documentation on all sides
- ✓ **3rd Party Verification:** Automatically generates electronically verifiable PDFs.
- ✓ **Global Implementation:** Designed to become a worldwide solution.



EBDN FUNCTIONALITY BUILT ON ESTABLISHED EXPERTISE

The eBDN solution draws from the rich heritage of industry insights, international customer base, and comprehension of the challenges associated with physical documentation paved the way for an innovative web-based application that seamlessly connects all stakeholders within the same system.

Moreover, for those already using or other bunker supply products, the eBDN seamlessly integrates, elevating efficiency to new heights.

THE SOLUTION OPERATES ON THREE KEY FRONTS:



Back Office Efficiency

Simplifies job creation and data management for bunker suppliers.



User-Friendly Web App

Enables easy document processing and e-signing for supplier's barge crew, receiving ship's crew, and independent surveyor.



Blockchain Verification

Generates electronically verifiable PDFs with blockchain-backed authenticity.

Our solution of eBDN isn't just about streamlining; it's about revolutionizing the bunkering industry, increasing transparency, and preparing shipping for a paperless future of bunkering.

ABOUT ZERONORTH BUNKER

Consolidating and optimizing the bunkering process, ZeroNorth Bunker turns millions of live data points into actionable recommendations.

BUNKERCHAIN Digital Bunkering

Touch and Sail eBDN Solution



Bunkerchain's eBDN system is a MPA whitelisted Digital Bunkering solution compliant to SS648 Standards designed to connect your shore operations and supply operations @ Sea. Our Digital Bunkering workflows and digital documentation meets the most stringent standards set by MPA for use in the Port of Singapore and beyond.

Move your conventional paper-based operations to ensure greater transparency, efficiency, and accuracy in your Bunkering operations.



Why Touch and Sail?

1. **Works in Signal and No Signal Situation:** Transition seamlessly in the toughest environments @ Sea. Transition seamlessly between Contactless (With Signal) and Contact (No Signal) operations, ensuring uninterrupted workflow.
2. **No Storage of Receiving Ship Stamps and e-Signatures:** System does not store your Ship Stamp and Signatures.
3. **Real Time Operations:** Enable real time monitoring from your shore office to all operations @ Sea.
4. **User Friendly:** Easy to use workflows and automated form filling functions for automated data input using OCR Technologies (Optical Character Recognition).
5. **Ensure Compliance:** Automated regulatory Reporting to MPA.
6. **Full Digital Audit Trail:** Maintain a comprehensive digital audit trail for document verification. Verify your eBDN by scanning QR code on the Document.
7. **Effortless Collaboration:** Seamlessly connect with various industry players like Bunker Suppliers, Ship Owners, Surveyors, Government, and more. Integrate with your internal workflow for a smooth and customized operational experience. Send reports seamlessly to MPA.
8. **Cybersecurity Ready:** Bunkerchain maintains ISO27001 certifications and the solution is CREST VAPT tested at predetermined intervals.

Specifications

1. **Solution:** Mobile and Web-based application. Offline mode ready for enhanced flexibility.
2. **Security:** Deploys secure encryption for both data in Transmission (Transit) and Storage (Rest), incorporates 2-factor authentication for Crew, and automated security updates.
3. **API Ready:** Integrate your ERP, CRM, and accounting systems and retrieve your eBDN when it is completed.
4. **Data Backup:** Automated data backups to ensure business continuity.
5. **Service Level Guarantee:** 99% Service Uptime with 24/7 service support.
6. **Training and Documentation:** Training support available upon request along with comprehensive documentation resources.

Company Profile

Bunkerchain is a Singapore Maritime focused Technology Startup made up of seasoned Bunkering, IT and Network professionals. Our Touch and Sail eBDN solution is whitelisted by MPA for use in the Port of Singapore and we are also the co-inventors of the World's first Digital Identity for Ships tied to the IMO Database built in collaboration with S&P Global Market Intelligence.



Bunkerchain Pte Ltd
78C Duxton Road,
Singapore 089537

Tel: +65 91760135
www.bunkerchain.io
info@bunkerchain.io



Prepared By:
Marine Fuels Committee (2023-2025)
Singapore Shipping Association
For more information, please email:
ssa.admin@ssa.org.sg

