

BEYOND TECHNICAL COMPLIANCE: NXTPORT AND THE GOVERNANCE OF NEUTRAL DATA INTERMEDIATION IN THE PORT OF ANTWERP-BRUGES

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ABSTRACT

The European Twin Transition is increasing pressure on seaports to develop into data driven logistics hubs. However, stakeholder reluctance to share commercially sensitive information remains a major barrier to digital integration. Although the EU Data Governance Act, Regulation 2022/868, provides a legal framework for neutral data intermediation services, evidence on their practical implementation in specific sectors remains limited. This study examines NxtPort, the digital utility platform of the Port of Antwerp Bruges, as a case of data intermediary governance. Using qualitative document analysis of publicly available governance artefacts, including the NxtPort Status Page, OpenAPI specifications hosted on GitHub, and the Service Desk portal, the study evaluates the platform's alignment with the DGA principles of neutrality, transparency, and accountability. The findings show that operational status monitoring, standardised API documentation, and formalised user support jointly strengthen stakeholder trust by making governance processes visible. The study contributes by introducing governance visibility as an analytical lens for assessing data intermediation platforms through publicly observable artefacts. This framework may also inform other ports and sectors seeking to balance data driven efficiency with regulatory compliance.

Keywords: Data Governance Act, EU Data Strategy, Smart Ports, Data Intermediaries, NxtPort

1. INTRODUCTION

The European Commission's Sustainable and Smart Mobility Strategy identifies digitalisation as a central driver of transport modernisation and links this transition to the objective of reducing transport emissions by 90 per cent by 2050 (European Commission, 2020). In seaports, however, the development of data driven logistics hubs remains constrained by a persistent trust gap. Digital integration requires the exchange of real time operational data, yet stakeholders are often reluctant to share commercially sensitive information with competitors or intermediaries (Richter, 2023). This tension is particularly significant in maritime ecosystems, where data have substantial economic value and the risks associated with disclosure are difficult to eliminate (Carlan, Sys, & Vanelslander, 2016).

The EU Data Governance Act addresses this challenge by establishing a Union wide framework for Data Intermediation Services as neutral facilitators of data sharing (European

Union, 2022). Such services are expected to operate according to principles of structural separation, non-discrimination, and transparency, ensuring that intermediaries do not acquire an independent commercial interest in the data they manage (European Union, 2022; Richter, 2023; Kolydas et al., 2026). Although the legal foundations of this framework are increasingly developed, limited evidence exists on how these requirements are implemented in specific sectoral contexts (von Ditzfurth & Lienemann, 2022; Bouzaidi et al., 2026). Insufficient attention has been given to the publicly visible governance arrangements through which intermediaries demonstrate neutrality, transparency, and accountability (European Commission, Joint Research Centre, 2023; Mussina et al., 2026). This article examines NxtPort, the digital utility platform of the Port of Antwerp Bruges, as a case of neutral data intermediation governance. The case is relevant because data sharing is already integrated into the port's operational processes, allowing governance practices to be examined in a mature digital environment. The article argues that NxtPort translates principles associated with the DGA into practice through visible operational information, standardised documentation, and formalised user support. It therefore introduces governance visibility as an analytical lens for assessing the alignment between platform practices and regulatory principles through publicly observable artefacts.

The study asks how NxtPort's publicly available governance arrangements reflect the DGA principles of neutrality, transparency, and accountability. In addressing this question, it seeks to clarify how data intermediation can support digital port integration while protecting commercial confidentiality and institutional trust.

2. METHODOLOGY

This study employs qualitative document analysis to examine how a digital port platform operationalises governance features associated with neutral data intermediation. Document analysis is suitable because it enables the systematic interpretation of publicly available organisational materials as evidence of institutional practice rather than as neutral representations of organisational reality (Bowen, 2009). Documents are therefore treated as socially situated artefacts that reflect and shape governance commitments, organisational arrangements, and user expectations.

The research design also follows Yin's single case study approach (Yin, 2018). The Port of Antwerp Bruges was selected according to four criteria. First, it represents a mature digital port ecosystem in which data sharing services are embedded in logistics operations. Second, it operates within the regulatory environment of the European Union and is therefore directly relevant to the DGA. Third, it provides extensive public documentation, including contractual terms, operational status information, technical specifications, and user support infrastructure. Fourth, these materials enable the study to assess how regulatory principles are translated into visible operational arrangements.

The documentary corpus consists of four publicly accessible NxtPort sources: the General Terms and Conditions, the NxtPort Status Page, OpenAPI specifications and developer materials hosted on GitHub, and the Service Desk portal (NxtPort, 2025a, 2025b, 2025c, 2025d). These sources were selected because they perform distinct governance functions and provide evidence on contractual rules, operational transparency, technical accessibility, and accountability mechanisms.

The analysis is deliberately limited to publicly accessible artefacts. This boundary is consistent with the objective of examining externally visible governance rather than internal organisational processes. It also improves transparency and replicability. Governance visibility is treated as a distinct analytical object because stakeholder confidence may de-

pend not only on internal governance arrangements, but also on whether those arrangements are visible, understandable, and accessible to users (Micheli et al., 2020).

This approach does not capture how governance is experienced by users or implemented within internal organisational processes. Public documents reveal how NxtPort communicates rules, service performance, and accountability procedures, but they do not provide evidence on informal practices, internal compliance culture, or power relations among stakeholders. The study therefore does not assess perceived trustworthiness, which would require interviews, surveys, or other participatory methods.

The analysis is organised around three dimensions derived from the DGA: neutrality, transparency, and accountability (European Union, 2022). These dimensions served as predetermined thematic categories for the systematic examination of the documentary evidence. Relevant provisions, statements, and structural features were identified within each source and compared across the documentary corpus to improve analytical consistency.

Neutrality and structural separation were assessed through the General Terms and Conditions, particularly the provisions concerning data use and the absence of an independent commercial interest in shared data (European Union, 2022; NxtPort, 2025a). Transparency was assessed through the NxtPort Status Page and the OpenAPI documentation, which provide evidence of operational visibility and technical accessibility. These features were interpreted in relation to the findability and interoperability principles of the FAIR framework (Wilkinson et al., 2016; NxtPort, 2025b, 2025c).

Accountability was examined through the Service Desk portal, with attention to the formalisation of user support, issue reporting, and service specific escalation procedures (European Union, 2022; Micheli et al., 2020; NxtPort, 2025d). Table 1 summarises the relationship between the documentary sources, the governance dimensions, and the main observations derived from each source.

The methodology combines legal, methodological, and scholarly references. The DGA provides the normative benchmark for assessing the governance arrangements (European Union, 2022). Bowen (2009) and Yin (2018) support the use of qualitative document analysis and single case study design. Additional scholarly sources situate the case within wider debates on data intermediation, institutional trust, and technical interoperability. This combination connects regulatory requirements, empirical evidence, and theoretical interpretation within a coherent analytical framework.

Table 1. Analytical mapping of documentary sources and observations

Governance artefact	Governance dimension	Analytical focus	Observation
General Terms and Conditions (NxtPort, 2025a)	Neutrality	Data-use restrictions, licensing structure, permitted platform role	Contractual provisions position NxtPort as a functionally limited intermediary rather than an independent commercial exploiter of shared data
Status Page (NxtPort, 2025b)	Transparency	Public visibility of service health and operational incidents	Platform continuity and service performance are made externally visible in real time
OpenAPI specifications and developer portal (NxtPort, 2025c)	Transparency / interoperability	Accessibility and standardisation of technical documentation	API documentation supports technical clarity and lowers barriers to integration
Service Desk portal (NxtPort, 2025d)	Accountability	Support channels, issue categories, escalation pathways	User support is formalised through structured and service-specific accountability mechanisms

Source: Author's own elaboration based on NxtPort (2025a, 2025b, 2025c, 2025d), European Union (2022), and Bowen (2009)

3. MAIN RESULTS

The analysis indicates that NxtPort applies the governance logic of neutral data intermediation through three observable mechanisms: contractual restrictions on data use, public visibility of system operations, and formalised user support. These mechanisms correspond to the analytical dimensions of neutrality, transparency, and accountability. Together, they demonstrate how governance commitments are communicated to users rather than remaining confined to internal technical arrangements.

3.1. NEUTRALITY

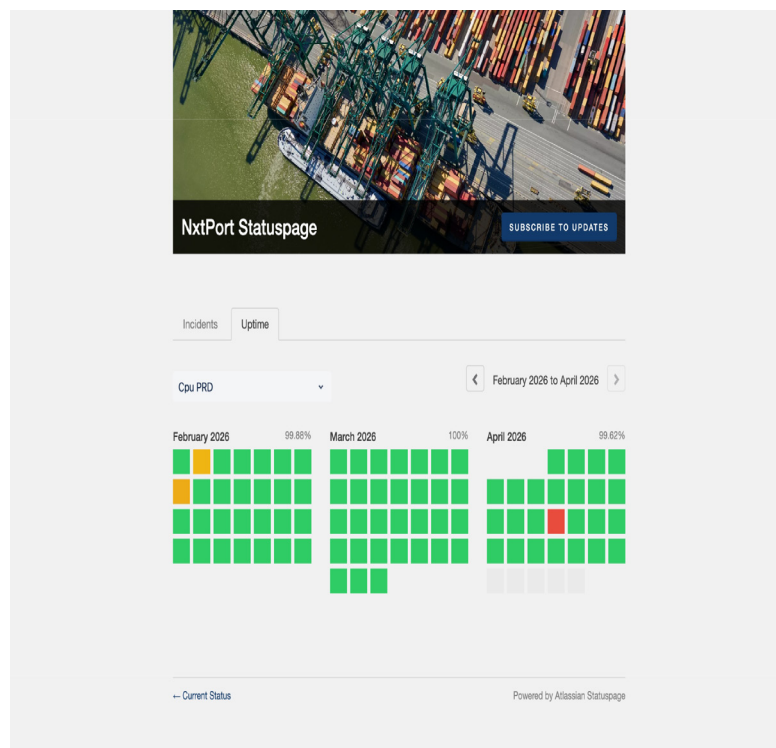
NxtPort's contractual framework shows functional alignment with several principles derived from the DGA, without establishing formal compliance with Article 12. Although the General Terms and Conditions do not use the terminology of the regulation, the licence granted by data providers is narrowly defined. It is nonexclusive, nontransferable, and limited to making data available to authorised users according to Data Sharing Rules established by subscribers (NxtPort, 2025a).

NxtPort is not granted a general right to use the data for its own independent commercial purposes. This arrangement is consistent with the intermediary function envisaged by the DGA (European Union, 2022; NxtPort, 2025a). The contractual structure therefore supports the interpretation of NxtPort as a platform that facilitates controlled data exchange rather than appropriating the economic value of the data it manages (Schweihoff et al., 2024).

3.2. TRANSPARENCY

Operational transparency is provided through the NxtPort Status Page, which publicly reports the condition of eight principal services and their associated components, including APIs, interfaces, login systems, and notification channels (NxtPort, 2025b). Although the monitored components differ across services, the platform makes service availability and disruptions publicly observable in real time.

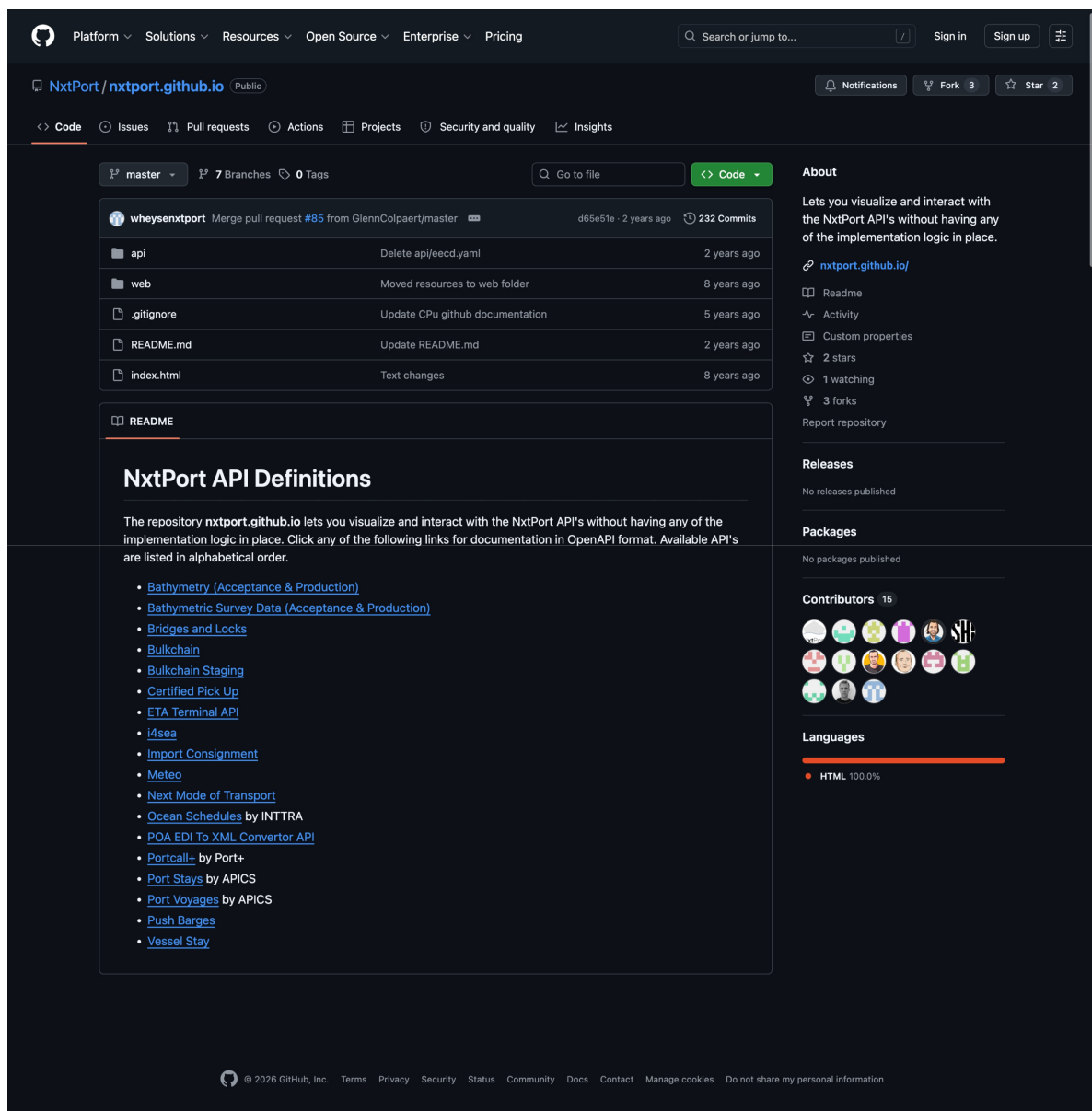
Figure 1. Screenshot of the NxtPort Status Uptime Page



Source: <https://status.nxtport.com/uptime>

This visibility reduces informational asymmetry between the platform operator and its users by making operational performance publicly observable rather than confining it to internal monitoring. Technical transparency is further supported by NxtPort's publicly accessible GitHub repositories, which contain machine readable OpenAPI specifications and an interactive developer portal for examining the available APIs (NxtPort, 2025c). These resources provide structured technical documentation that users and developers can review before implementation. By clarifying system interfaces and access requirements, they support practical interoperability and more informed participation in the platform.

Figure 2. Screenshot of NxtPort's GitHub repository



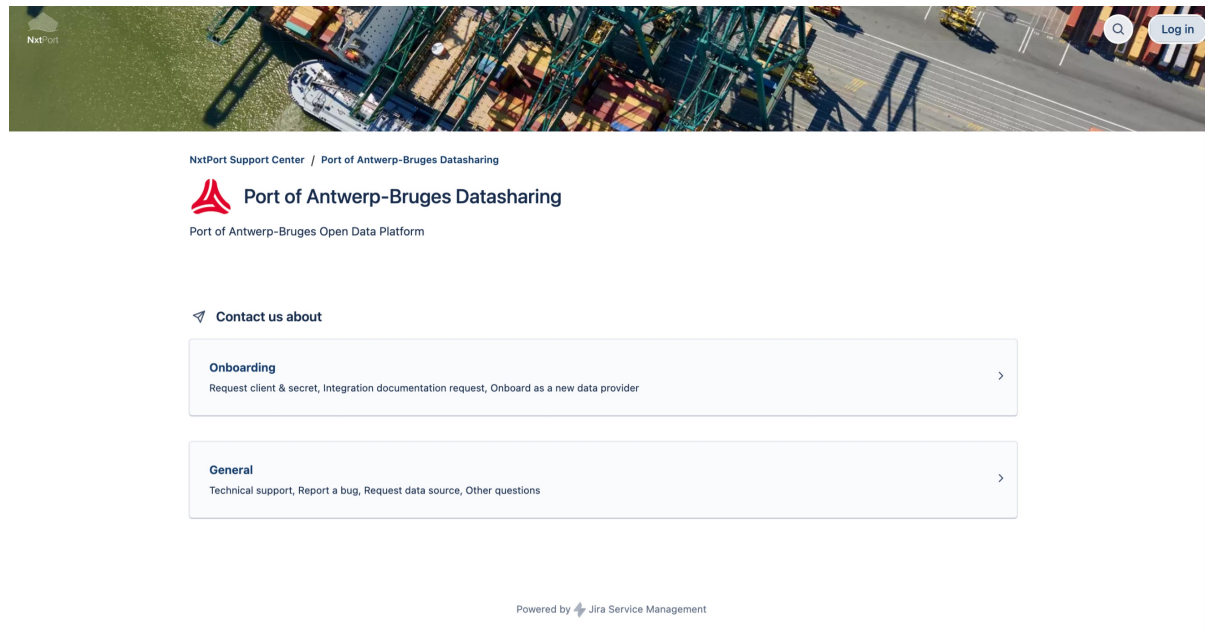
Source: <https://github.com/NxtPort/nxtport.github.io>

These features can be interpreted through the Findability and Interoperability dimensions of the FAIR Guiding Principles (Wilkinson et al., 2016). In this study, however, the FAIR principles serve as an analytical lens rather than as a formal compliance standard (NxtPort, 2025c).

3.3. ACCOUNTABILITY

Administrative accountability is visible in the structure of the NxtPort Service Desk portal, which provides dedicated support channels for specific platform services (NxtPort, 2025d). The portal includes categorised forms for technical assistance and issue reporting, thereby formalising interaction between users and the platform's support functions. Rather than leaving complaint and resolution procedures informal or unclear, NxtPort provides identifiable channels through which operational problems can be reported, processed, and addressed.

Figure 3. Screenshot of NxtPort's Support Center for the Port of Antwerp-Bruges Open Data Platform



Source: <https://nxtport.atlassian.net/servicedesk/customer/portal/5/group/-1>

This support structure is significant because accountability in data intermediation depends not only on legal compliance, but also on accessible procedures for addressing user concerns (Micheli et al., 2020). The Service Desk therefore complements the contractual and technical elements of the platform by establishing an administrative basis for trust (European Union, 2022; Micheli et al., 2020; NxtPort, 2025d).

Overall, the evidence suggests that NxtPort promotes trust through a layered governance model rather than through a single compliance mechanism. Contractual restrictions, operational transparency, technical documentation, and formal support procedures collectively make neutrality, transparency, and accountability visible and understandable to stakeholders.

Table 2 summarises the findings by governance dimension and explains their interpretive significance.

Table 2. Summary of empirical findings by governance dimension

Governance dimension	Empirical source	Key finding	Interpretive significance
Neutrality	General Terms and Conditions	NxtPort's contractual role is limited to authorised data-sharing functions	Functional alignment with the DGA's structural-separation logic
Transparency	Status Page; OpenAPI repositories; developer portal	Platform operations and technical interfaces are publicly visible	Supports transparency of operations and facilitates interoperability
Accountability	Service Desk portal	Support and issue-resolution pathways are formalised and service-specific	Strengthens administrative trustworthiness and user recourse

Source: Author's own elaboration based on NxtPort (2025a, 2025b, 2025c, 2025d), European Union (2022), Micheli et al. (2020), Schweihoff et al. (2024), and Wilkinson et al. (2016)

4. CONCLUSION

This study examined NxtPort as a case of neutral data intermediation governance within a European port ecosystem. The findings indicate that NxtPort reflects principles associated with the Data Governance Act through a layered governance model based on contractual limits on data use, public operational and technical documentation, and structured user support (European Commission, 2020; European Union, 2022). These mechanisms suggest that trust in data intermediation depends not only on technical architecture, but also on the visibility of governance commitments and the accessibility of accountability procedures. The findings support Micheli et al. (2020), who emphasise the organisational foundations of data governance, and extend this perspective to a regulated maritime context. They also provide an empirical illustration of the conceptual role of data intermediaries discussed by Schweihoff et al. (2024) and show how principles associated with the DGA may be translated into operational arrangements rather than remaining confined to legal doctrine (von Ditzfurth & Lienemann, 2022). The NxtPort case therefore contributes to research on port digitalisation by demonstrating how regulatory expectations can become embedded in the governance of an active logistics platform.

Governance visibility should not, however, be treated as proof of neutrality or an absence of risk. Publicly accessible documentation can make platform practices more understandable without resolving all tensions within data sharing ecosystems. In the NxtPort case, its relationship with the Port of Antwerp Bruges raises questions concerning the practical independence of the intermediary from the interests of a major port authority. Public artefacts also provide limited insight into internal decision making, enforcement procedures, conflict resolution, and organisational culture. In addition, differences in bargaining power between large logistics operators and smaller participants may influence how principles of neutrality and non-discrimination are experienced in practice.

The case has broader relevance to the European Data Strategy and the Sustainable and Smart Mobility Strategy. It shows that digital transformation in ports requires more than technological modernisation. It also depends on governance arrangements that make data sharing understandable, reliable, and institutionally credible. Governance design can therefore be considered an important dimension of digital maturity because it shapes the conditions under which stakeholders are willing to participate in shared data environments. NxtPort provides a context specific illustration of how a port platform may align its practices with emerging European data governance principles before obtaining formal

recognition under the DGA. However, the analysis does not establish legal compliance with Article 12. The platform's alignment is inferred from public governance artefacts and contractual arrangements rather than from formal notification as a Data Intermediation Services provider. The findings should therefore be understood as evidence of functional alignment with selected DGA principles rather than confirmation of full regulatory compliance.

The study makes three principal contributions. First, it provides empirical evidence of how principles associated with the DGA are expressed through publicly observable arrangements in an operational port platform. Second, it demonstrates the value of combining legal standards, qualitative document analysis, and data governance theory when examining digital intermediation in regulated sectors. Third, it introduces governance visibility as an analytical lens for assessing the relationship between platform practices and regulatory principles without requiring access to internal documents or stakeholder testimony.

The study is subject to several limitations. The analysis is restricted to publicly available materials and therefore excludes internal governance practices. The single case design supports analytical rather than statistical generalisation. In addition, the study provides a static assessment and does not capture how NxtPort's governance arrangements may evolve in response to the formal implementation of the DGA.

Future research should compare formally notified and voluntarily aligned data intermediaries, examine changes in platform governance over time, and incorporate stakeholder perspectives through interviews and surveys. Such research could determine whether publicly visible governance arrangements increase perceived trust and whether formal recognition under the DGA produces measurable organisational changes.

Despite these limitations, the NxtPort case demonstrates that visible and layered governance can provide a credible foundation for balancing commercial confidentiality with the data sharing requirements of an increasingly digital maritime economy.

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Conflicts of Interest

The author declares no conflict of interest.

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