Report

Decision on the reference architecture of the Market-Wide Half-Hourly Settlement Target Operating Model

Publication date:	14 December 2021	**Contact:**	Rachel Clark, Deputy Director Retail
		Team:	Retail Directorate
		Tel:	020 7901 7371
		Email:	halfhourlysettlement@ofgem.gov.uk

Ofgem has decided that industry should establish an Event Driven Architecture (EDA) to enable the Target Operating Model (TOM) for Market-wide Half-hourly Settlement (MHHS).

In July 2021, Ofgem published a preliminary decision[1] in support of the Architecture Working Group's (AWG) recommendation[2] that industry develop an EDA to enable the MHHS TOM, subject to further information supporting this conclusion. We have since received and evaluated new information on the costs of building and operating such a system, including the relative costs of partly or fully replacing ElectraLink's Data Transfer Network (DTN), the interaction between different communication systems and the EDA, and the security aspects of any new system. We have also considered the potential for future innovation and wider developments on data handling in the energy sector. Taking all this into account, Ofgem has decided that, as recommended by the AWG, the industry should develop a hybrid architecture comprising the DTN with minor modifications and a new EDA platform to meet the requirements of the MHHS TOM. Ofgem will shortly be consulting on the issue of which party should be responsible for the ongoing governance, operation and funding of the new EDA platform. We expect to publish that consultation by mid-January with a view to considering the responses and publishing our decision in March.

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[1] Ofgem's Preliminary decision on the AWG TOM recommendation reference architecture, July 2021.
[2] The AWG's recommended architecture is based on 'business events' such as new meter readings or a change in registration (hence 'event driven architecture' or EDA).

The wider context

The transition to a low carbon energy sector will drive increasing complexity as the number of energy markets, assets, services and market participants proliferate, and the benefits of clear communication and data sharing grow. The smart creation, collection and use of energy system data is fundamental to managing this complexity, and for unlocking new sources of value for all energy stakeholders, including improved consumer protection.

Our data and digitalisation Strategic Change Programme aims to ensure better regulatory decisions are taken through the improved use of data, and that data is used more effectively by the market. Through this Strategic Change Programme we are seeking to establish and embed data best practice in industry programmes to enable cross-sector exchange of data and deliver whole system benefits. One of the objectives of the Strategic Change Programme is to enable the sector, through new and existing shared infrastructure, to grow and develop future data and digital solutions that work for consumers.

It is with this in mind that Ofgem has considered the AWG's recommended reference architecture for the MHHS TOM.

Outstanding issues

In July we said that Ofgem broadly agreed with the principles of an EDA as a suitable solution for the MHHS TOM but that we needed more information to make a final decision. Drawing on information recently provided by MHHS Programme (MHHSP), we set out the matters that we have been considering and state our position on them.

The costs of building and operating an EDA, including cost differentials between fully or partially replacing the DTN and the costs and benefits of moving all DTN-related traffic to the EDA or only traffic that is necessary to enable the MHHS TOM

MHHSP has considered the three options summarised in the table below. Option 2 was recommended by the AWG.

Option 1	Upgrade the DTN so that it meets MHHS requirements
Option 2	Develop a hybrid 'DTN+EDA' architecture where the EDA hosts most TOM business processes and handles 30% of industry data flows (and the DTN handles 70%)
Option 3	Completely replace the DTN with an EDA

Option 1 does not fully deliver all the benefits required from MHHS. This is because an upgraded DTN could not provide a real-time message exchange, in-built auto-scaling and solution templating. These services and product characteristics are vital if the industry is going to be able to unlock fully the benefits of data and digitalisation. So whilst option 1 is relatively low cost, it does not meet the business case requirements and has been discounted.

Option 3 would involve a full replacement of the DTN as part of the MHHS programme. This would fully deliver all the benefits but would entail a singular "big bang" deployment where MHHS changes are delivered alongside the move of all the non MHHS impacted DTN flows to the new platform. MHHS only impacts 30% of the current flows in use on the DTN. There would be a significant body of work to deal with the additional 70% of DTN flows which would greatly extend the critical path of the programme and increase costs in the delivery of the EDA platform. This would also place a large additional cost burden on all users of the DTN given the scope of the internal changes that parties would need to make to configure all flows to use the new platform. Significant participant and industry testing would also be required over and above that required for the core MHHS changes to cover the processes unaffected by MHHS that make use of the DTN. This would represent an enormous increase in scope to the MHHS programme. The level of change that this would require across industry would bring with it a high level of delivery risk if delivered as a singular release. Option 2 essentially enables the alternative of an incremental move away from the DTN following the deployment of the MHHS core changes and EDA. For these reasons we do not consider that option 3 would be practical or offer value for money compared to option 2 and this option has been discounted.

Option 2, which is the AWG recommendation, would fully deliver the benefits of MHHS and take 3 to 4 years to deliver. Central development and operation costs are estimated to be in line with other industry information exchange platforms. We have seen estimates of this cost and are content that there is no material effect on the MHHS impact assessment. Other MHHS participants would need to develop Application Programming Interface layer connectivity for the changed interfaces or to procure an adaptor service. The costs of doing so are not yet clear, but are likely to be in line with costs of adaptor services used elsewhere in the industry such as for connection to DCC or the CSS.

The hybrid option would deliver real-time message exchange, modern 'cloud' architecture and a new strategic platform from which – importantly - further industry change could be undertaken at reduced time and cost. The EDA will have the potential to process millions of messages per second and be dynamically scalable in response to heavy volumes. We note,

too, that retaining the DTN need not preclude its eventual full replacement. The desirability of doing so could be reassessed towards the end of MHHS implementation when there would be a better understanding of the capabilities of the new EDA platform and the DTN, and the development work that would be required.

Option 2 sits between option 1 and option 3 on costs, but we have identified that option 1 would not deliver programme benefits. The costs of option 2 do not materially alter the overall cost benefit analysis for MHHS and we believe they are justified by the additional benefits from developing an EDA. **We therefore support option 2.**

Options relating to agent appointments

The MHHSP Design Team has been running a series of workshops with a sub-group of members from the Code Change Development Group. MHHSP is now refining the available options that are broadly a variant of the existing process and the Registration Service orchestrated process as described in the TOM. The final decision about which option to pursue will be managed through MHHS programme governance and we strongly encourage all affected parties to engage closely with this process.

Interaction between different communications systems (some of which carry out batch processing) and an EDA with 'near real time' processing capability

The EDA will be able to support both 'batch' like and 'near-real time' interfaces. The near real-time processing capability of the EDA itself will not directly impact any upstream or downstream connected system as the EDA will only send messages as quickly as it receives them (the target is to relay 90% of messages within 1 second of receipt). The EDA will be able to provide a message buffer for connected systems, allowing downstream systems to dictate the rate at which messages are consumed. In addition, it will store messages on-line for up to 14 days. For businesses processes supported by the EDA, any end-to-end data integrity issues will be dealt with on a case-by-case basis. We understand that MHHSP will issue an Operational Choreography document that describes the process integration, including any timings required for the key events (system transactions) that will support the underlying business process for new half-hour settlement arrangements.

We understand that the EDA will have no direct interfaces with the DCC, the DTN or the 'Core Services' of the Central Switching Service (but there will be indirect logical connections to the Core Services). There are indirect connections to the CSS via the registration systems and to the DCC via the Smart Data Services. It is anticipated that the

DCC will connect to the Supplier (as happens today) and additionally to the MDR – which would then provide data to the SDS. There is no direct SDS/DCC flow of information and the SDS will not be a DCC user. MHHSP will set out a 'Code of Connection' agreement on the standards and obligations that market participants must adhere to when connected to the EDA. This will describe how market participants are expected to separate their connections to the Core Services including the EDA.

MHHSP has been engaging with the various communications operators in relation to the interactions between an EDA platform and their respective communications systems. No critical issues have been identified to date. Representatives from the interfacing systems and their associated code bodies will be present within the Level 4 working groups and other programme governance forums. We expect MHHSP to capture any impacts as these processes are refined.

We also expect that all parties, including the associated code bodies, will continue to engage constructively and efficiently as the detailed design is taken forward in the relevant governance workgroups. Close and continuous involvement with the emerging detail should give parties sufficient opportunity to assess all upstream and downstream market impacts and so ensure any consequential impacts are properly considered in the end-to-end design.

Security issues, including whether an EDA would be suitable if end-to-end encryption were required for settlement-related data

In our preliminary decision we recognised that further information was required on the security aspects of any new system. Specifically, we have sought assurance that the EDA is capable of, and suitable for, providing the security arrangements needed for handling settlement-related data. We have considered whether end-to-end data encryption would be required and, if so, whether it would be compatible with a publish/subscribe architecture.

MHHSP recognises there are messages flowing through the MHHS Data Integration Platform (DIP) that contain sensitive data as defined under the GDPR. The working assumption is that TLS (Transport Layer Security) will be used for encryption of data at the physical transport layer and mutual TLS (mTLS) will be used to further encrypt the payload of any messages containing sensitive data flowing through the DIP. The MHHS Programme has identified a potential requirement to inspect message payloads for routing purposes, in this case an option to secure this data could be an encryption device to maintain integrity. There are other options that could be considered as detailed requirements evolve.

Implementing TLS and mTLS requires establishing digital certificate services. It will be important to ensure that any Digital Certificate issuing entity or methodology is tested by an external independent tester. Under the DCC, a significant amount of work has gone into establishing a robust set of certificate services. MHHSP recognises that there are potential benefits across the industry if the already established certificate services can be used. To this end, MHHSP is at an early stage of engaging with the DCC to discuss whether, and if so how, the infrastructure and services they provide to deliver the SWIKI could be leveraged by MHHS, so as not to further burden the industry with additional certificate services.

Ofgem agrees that this should be explored. Any relevant decisions would need to be taken in the light of the evidence at the time. This will need to include analysis on costs and benefits across all MHHS participants. Whilst the DCC is ISO27001 certified and a number of participants will be ISO27001 certified, the assumption is not all participants will be compliant to such a standard. MHHSP will undertake a security audit of all potential users of the EDA and identify those not currently certified to assess any potential risk.

Ofgem, in consideration of the comments above from MHSSP regarding the security concerns raised, accepts that there are no blocking security concerns.

Conclusion

In the light of the further information that has been provided by MHHSP, Ofgem is now able to approve the AWG recommendation in relation to the introduction of an EDA.

Next steps

In light of our decision to approve the AWG's recommendation, Ofgem will shortly consult on the issue of which party should be responsible for the governance, funding and operation of the EDA platform. We expect to publish that consultation by mid-January with a view to considering the responses and publishing our decision in March. We expect to hold a stakeholder event as part of the consultation process. Further details will be provided in the consultation document.

In parallel with consideration of the enduring governance, funding and operation of the EDA we expect MHHSP to continue to move forward with the definition and sourcing of the EDA in line with the requirements of the transition timetable.