ESO

Data & Technology Advisory Group

Meeting 2 Minutes

Date:	03/05/2023	**Location:**	Virtual
Start:	13:00	**End:**	15:00

Participants

Attendee	Organisation
Sebastiaan Van Dort (Chair)	BSI – British Standards Institute
Erwin Frank-Schultz	IBM - International Business Machines
Tom Pollock	Northern Gas Networks
Prof Gareth Taylor	Brunel Institute of Power Systems
Dr Priya Mothilal Bhagavathy	PNDC – Power Networks Demonstration Centre
Simon Evans	Arup
Jonathan Barcroft	ESO
Divya Mahalingam (Facilitator)	ESO

Agenda

1. **Apologies for absence**

2. **Discussion: Distributed data sharing principles**

3. **Discussion: Future technology vision**

4. **Discussion: Worked examples through VirtualES use cases**

5. **Next meeting**

6. **AOB**

Discussion and details

1. **Apologies for absence**
   - Bethan Winter - Wales & West Utilities
   - Abbas Mahmood - Energy Networks Association

2.   **Discussion: Distributed data sharing principles**

- Data Mesh is a decentralised sociotechnical approach to sharing data in large and complex environments – within or across sectors. We are adopting principles from this approach for developing the VirtualES architecture. Data security and cyber security are also crucial for the VirtualES and will need to be imbedded across the architecture, especially where sensitive information pertaining to power grid operations and power consumption data is shared – they must be protected from potential threats.

Reflection Point

- ***Does the distributed architecture approach in your view meet the key objectives of the VirtualES? If not, what approach would you suggest?***

Discussion

- Data mesh sees key shifts in approaches to organisations and architectures and adopts a set of principles, including self-serve data platform, data as a product, domain ownership of data, and federated computational governance. This approach sees a shift from traditional sharing of analytical data using monolithic data platforms and centralised ownership, to a distributed approach with decentralised ownership.

- ESO explained that the socio-technical approach to sharing data is looking more organisationally decentralised, and not creating a single central platform for data sharing.

- It was mentioned that the trend towards a decentralised architecture started decades ago - driven by the advent of service-oriented architecture and then - by microservices. It provides more flexibility, is easier to scale, easier to work on in parallel and allows for the reuse of functionality.

- Overall, the concept of decentralised distributed architecture was agreed as good, but a lot of models already exist and not necessary to create new modelling for VirtualES.

- It was advised that integrating the current architectural approach/model and using a range of legacy solutions that are out already for creating a hybrid model, can be beneficial for the VirtualES distributed architecture approach.

- The group mentioned that more details around data maturity and metadata will be useful in understanding the diagram for the VirtualES distributed architecture approach.

- In a hybrid model some newer systems might be compliant to this architecture and others might not, for instance, some of them will have code and data combined in order, but lot of legacy systems might not have that order. So, it is important to consider how we bridge between fully self-describing data and legacy data sets that have limited features.

- It was suggested that metadata which describes data can be useful in building the bridge.

- It was shared that in practice there are some challenges, like looking at purely Application Programming Interfaces (APIs) driven exchange of data, there are large volumes of data which are not particularly suited to exchanging this approach, for example geospatial data.

- It was explained, since APIs usually cannot handle massive quantities of data in single queries, that pulling a complete history will require scripting to import data in small chunks at a time creating a big processing overhead on extraction.

- Discussion moved to policies applying to data product which needs addressing and adoption of some standards to manage those data in an open environment:
  o   Are you allowed to add data to an existing set of data?
  o   Are you allowed to send data on to somebody else?
  o   What if you mix data you've received from one party?
  o   How to manage the contractual relationship that flows through along with the technical ability to obtain data sets?

- It was mentioned that data mesh is primarily an organisational approach that defines responsibilities and coordination across separate domain teams and their data products.

However, the right technology is needed to enable the domains to follow the data mesh concept in a feasible way. It was also suggested that architectural design and approach can be more contextualised.

- Discussion concluded with a debate on layered approach. It was said that the distributed architecture design for data mesh is a combination of lot of other reference layer modelling approaches that have been developed. The layered approach is often quite a useful approach, at a higher level, application architecture layers could be used for business and operational processes going down to other layers: to network layers, physical layers, and exchange information.

- Technologies likes quantum computing and artificial intelligence (AI) implications are not explicitly clear. This can be a future threat as we don't know the direct implications and types of risks.

Recommendation

- ESO to explore the existing legacy systems within industry and how to integrate the most value out of the data that we already have.

- ESO to explore the work that goes on at an international level to identify potentially complementary road mapping and standardisation for VirtualES.

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3.   **Discussion: Future technology vision**

Reflection Points

- ***Is there anything missing from or not accurately described within the high-level design we have presented?***

- ***How would data producers and consumers in your organisation react to this platform? Would there be strong support and need?***

- ***What resistance or challenges would you see there to the implementation of this?***

Discussion

- The group considered that the future technology vision diagram was difficult to use to understand how the systems would function in practice. For example, the likely flow of data from one side to the other in example use cases is not shown but could help this understanding. This would help to communicate whether it is a push or pull system or combination which was less evident in the diagram.

- It was agreed that strong use cases in place will support designing both data mesh and future technology vision. This can provide the means for a logical walkthrough and make it easier to understand the process.

- It was suggested that there are a lot of resources are out there and selecting those appropriate use cases, which will demonstrate how this would work for the VirtualES with the involvement of key actors across the energy system, including Gas and Electricity System Operators, will be beneficial.

- It was agreed that in order to achieve this approach a lot of resource need to be put in place with expertise and engagement.

- Having patterns of data access and mapping use cases may be a good starting point. This is going to be an important part of this whole design and architecture process to evaluate distributed architecture approach and decide where to go.

- From a commercial perspective, it was discussed that data producers and consumers in an organisation will give varied support to this approach, depending upon the financial implications, and the challenges around their current data standardisation and data maturity.

- It was mentioned that formal techniques could be beneficial e.g., methods for specifying use cases, including descriptions of data flow, and most importantly involving actors who can build these ideas with other parties.

- Discussion concluded on potential for automating the process. It was considered that there are methods for standardising metadata which are quite mature and exchanging it can be automated or AI could in future be used to generate that transformation. It was also mentioned that the balance between automation and human control will be significant in the implementation of transformation.

Recommendation

- More appropriate use cases could be helpful to understand the future technology vision diagram.

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4. **Discussion: Worked examples through VirtualES use cases**

Reflection Point

- ***Do you think these use cases will be suitable for demonstrating the common framework elements for VirtualES?***

Discussion

- It was explained that the idea is that these 3 use cases build on each other and demonstrate the broad applicability of the High-Level Design:
  - **DEMONSTRATOR** - The demonstrator is based on the published VirtualES whole system flexibility use case definition (an electricity network use case with parallel consideration of comparable opportunities in gas). It explores the opportunity to re-route electricity between grid supply points (GSPs), in certain configurations, by using the existing infrastructure.
  - **CROWDFLEX** - Building on two pioneering projects (CrowdFlex: NIA and the Domestic Reserve Scarcity Trail); CrowdFlex: SIF will clarify the role domestic flexibility can play in addressing the system challenge of decarbonisation.
  - **ADO** - This project will research best practices globally and the advanced technologies available (or being developed), to assess the feasibility of developing an advanced dispatch optimisation tool for the Balancing Mechanism (BM). This will build on Crowdflex to allow for faster responses to flexibility.

- A group recommendation was that the data flow could be clearly specified and defined in the use case. It is an important part because some participants and people may have not engaged or participated before, and they would be interested to see how data can be used and available to other actors in the market. Also, a suggestion for a more developed level of detail for the above use cases was presented to the advisory group.

- As the energy system is going to become much more complex, with many more cross sector interactions like gas, water, hydrogen and transport, it will be useful demonstrating the common framework elements for VirtualES by interacting with these sectors and their use cases.

- It was suggested that further work on the user mapping will help to identify gaps, avoid duplication, and prioritise and encourage the right use cases.

- It was explained that in creating a framework more focus can be on strategic planning of implementation of the VirtualES. There is no one right or wrong way to create a strategic plan, and you can modify models and frameworks based on company culture, current situation, and the purpose behind the planning.

- Strategic planners often utilise different frameworks or customise particular models, as they move through the planning process. Below is a list of some of the most common frameworks and models discussed:
  - **Alignment Model**: This model helps align your mission statement with available resources.
  - **Gap Planning**: A strategy gap is the distance between how a company is currently performing and its desired goal.
  - **Strategy Mapping**: This approach helps organisations design and communicate their strategies

Reflection Points

- ***Are the steps described a suitable approach to production implementation, or are we going too fast/slow?***
- ***Are the VirtualES common framework factors sufficiently well understood and reflected in the technology vision for the VirtualES?***

Discussion

- It was agreed by the group that steps to production implementation is in pace and not too slow.
- It was mentioned that the feasibility study explores the scope and content for a Common Framework, investigates how it can be informed by current best practice, and recommends possible delivery approaches.
- It was discussed that Innovation plays an important role in planning incentives for the VirtualES programme and encourages people to contribute for the benefit of the technology vision of the VirtualES.
- Discussion concluded with a suggestion to look globally for related innovation projects as there is a lot of activity going on now, especially with digital twins. It is beneficial to be aware of what's happening, road maps, expansion planning and transparency platforms for data and technology.
- ESO confirmed speaking with Ofgem and Department for Energy Security & Net Zero (DESNEZ) about the VirtualES programme regularly and sharing contents from the advisory groups.
- ESO also mentioned that the use case advisory group is looking at how we can share with the group what's progressing in a way that allows us to have a more constructive conversation about data and technology.

| 5. | **Next meeting** |

- The next meeting will be held on Wednesday 28th June from 13:00 to 15:00.

| 6. | **AOB** |

- The Chair thanked the group for their attendance and contribution.