Study Committee D2
Information Systems and Telecommunication
Paper 10753_2022

A PRACTICAL APPROACH FOR ENHANCING STAKEHOLDER EFFECTIVENESS THROUGH IMPROVED ASSET AND GRID INFORMATION GOVERNANCE – ACHIEVING DIGITAL UTILITY STATUS BY 2024

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Motivation

- The existing Information systems such as operational systems (real-time status and measurements), protection system analysis, asset management, geographical information, predictive forecasts, cost management, etc. are siloed.
- Information interactions with regulators, other end users, and business / solution partners create additional effort of data entry/ replication.
- Avoiding multiple data entries, governed information management, and identifying single source of truth is essential for an efficient Asset Management of T&D utilities.
- Meeting Regulatory requirements and achieve Power and Water network visibility in a central location at Transmission Operator (TO) independent from System Operators systems. Addressing all the information gaps within TO asset management environment.

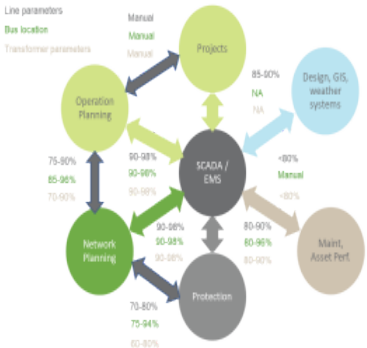

Figure 1

Methodology

- The two-step approach to enhance stakeholder effectiveness digitally
- The first step is to enhance the governance processes to address gaps in the current Information Systems. Perform a study on the existing processes based on global asset management standards (ISO 55000) and the detailed review of existing Operation Technology (OT) and Information Technology (IT) landscape.
- The next step is to verify and define adherence of these processes to the standardized solutions. Enhance information governance through reference data management and compliance-driven processes adhering to global asset management standards, industry compliant information models, and processes.

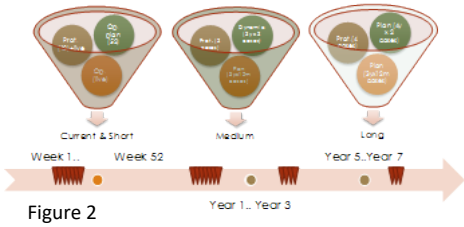

Figure 2

Objects of Investigation

- Figure 1 represents the gaps observed between various existing information systems
- Figure 2 shows complexity and replicated network modelling process in a planning and operation environment.
- Figure 3 is outcome of Operation Technology incident analysis report, with the corresponding impact on the transmission network.
- Figure 4 represents the Asset Life Cycle Information Flow

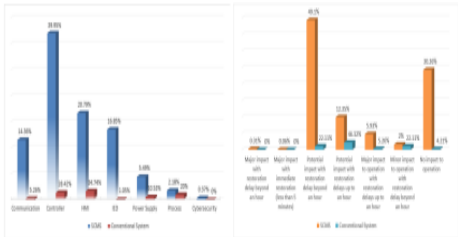

Figure 3

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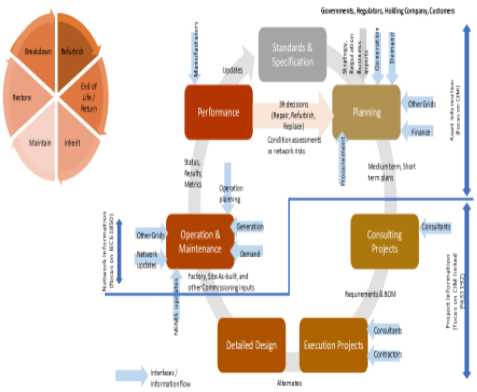

Figure 4

Model based Approach

- Overall asset life cycle information flow (Figure 4) is in alignment to Global Asset Management Standards (PAS 1192/ISO 19650). They focus strongly on capital and delivery rather than ascertaining the lifecycle needs of the industry. The applicability of the PIM/BIM across the grid companies is lean. Hence, significant actions are envisaged for transitioning from PIM to AIM.
- Utility industry standards such as CIM to improve the ability to integrate between the internal and external IT subsystems.
- Develop reference data models to boost quality, relationship, and the integrity of the asset, and grid information to deliver transparency between the utility stakeholders.
- Establish processes linked with formation of key metrics such as stability, reliability, and security of power networks, and asset performance by bridging gaps in current information systems.
- Address challenges for managing roles and responsibilities through executive authorization and identify additional capabilities.
- Every system represents a few multi-dimensional perspectives of both connected assets and associated systems that are being managed in a way that will help them to perform their role/activity diligently and independently.
- The approaches to maintain the quality, relationships, and integrity of the connected network system models, attributes, hierarchies, and associated subsystems for asset management are considered.

Key Capabilities needed

- Figure 5 describes shared use of custom-built models in a Common Data Environment (CDE), being a single source of information for any given project, used to collect, manage and disseminate all relevant approved project documents for multi-disciplinary teams integrating sustainable design processes.
- CIM is recommended due to the fact that it provides a strong foundation for vendor neutral environment and leverage benefits of interoperability and interchangeability.

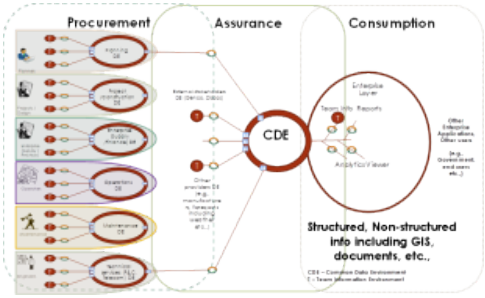

Figure 5

- Establishment of new processes for Network Model Management is mandatory. Figure 6 displays the scope of network model management solution.
- Figure 7 represents end to end overview of Asset Performance Management, Risk Optimization & Investment planning solution

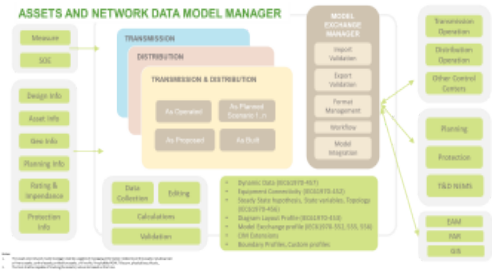

Figure 6

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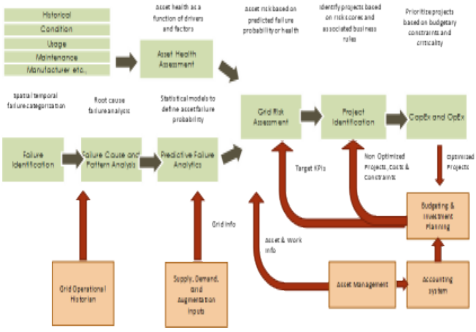

Figure 7

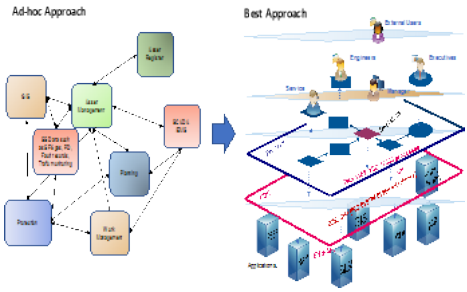

Figure 8

Seamless information orchestration

- Data infrastructure and foundation for the Common Data Environment (CDE) includes Data Lake, Network Model Management, Enterprise Service Bus (ESB), and Business Process Management for seamless integration.
- Refer Figure 8, depicting an overview of enterprise level users benefitting from the model based integration between processes and applications. This recommended approach resolves the inconsistency challenges for the information consumption confronted by the existing ad-hoc integrations between subsystems
- Refer Figure 9, represents the Digital Twin Architecture to support T&D portion.

Conclusion

- Empowering all the stakeholders with a matured digital experience in all phases of the life cycle requires the establishment of Digital Twin based on CDE to act as a bridge between OT and IT systems.
- A governance structure including business, technical, model & data are critical to support the convergence of OT/IT technologies, business transformation, and integration.
- The standardized applications will help utilities achieve digital maturity at a faster rate and enable them for future disruptions like cloud, IoT, blockchain.
- Enable multiple product partners supporting each operational concept to reduce the system reliability risks.

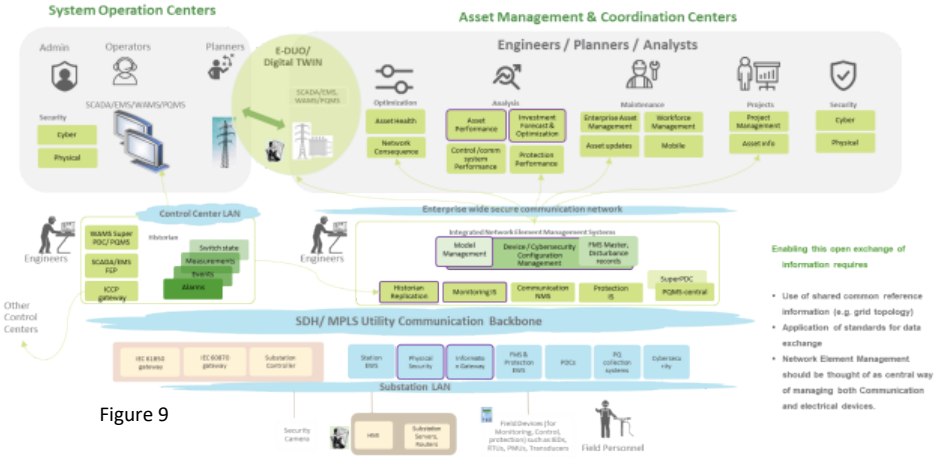

Figure 9