

A Journey Through an Innovative Approach to Migration of Legacy System to New Multilingual Statistical Computing Environment (SCE)

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ABSTRACT

Clinical trial data analysis is continuously evolving and the need to expediate data analysis has led many companies to move to a new Statistical Computing Environment (SCE) with built-in capabilities.

Migration from a legacy SCE to a new SCE is a very important process to ensure a smooth transition and no loss of data.

This paper delves into an agile migration process, highlighting some key factors such as the importance of a well-prepared migration team, the establishment of comprehensive processes and training, an awareness of people's mindset, a close collaboration with technical teams and robust stakeholder management. This paper also discusses the challenges faced during migration, such as handling various study scenarios, migrating through critical timelines, handling restricted data and maintaining an ever-growing inventory.

The findings underscore the potential of SCE migration to drive significant improvements in data handling and analysis within the Pharma industry, emphasizing the need for continuous innovation amidst emerging trends and technologies.

INTRODUCTION

Migrating to a new Statistical Computing Environment (SCE) can be an overwhelming task, requiring careful attention to detail to ensure that all projects, studies, and artifacts are fully accounted for with absolutely no data loss. This paper delves into the steps that will set you up for a successful SCE migration, detailing both the essential components of the process and the potential challenges that may arise. It provides a comprehensive guide to help you prepare for and execute smooth SCE migration.

The preparation for SCE migration involves several key components. Firstly, it is essential to assemble a dedicated migration team of experts to carry out the entire process. Developing a detailed and fit-for-purpose migration strategy is crucial, as it outlines the steps and methodologies to be followed. Additionally, designing and implementing a robust migration tool will facilitate the migration process and ensure reliability. Preparing essential documentation, such as mapping documents, questionnaires and checklists, will guide migration and help maintain organization. Training sessions should be conducted to educate study teams about the migration strategy and process flow. This will ensure that everyone involved is well-prepared and understands their role in the migration process. Incorporating Agile principles, such as iterative progress and continuous feedback, can enhance flexibility and responsiveness throughout the project. Effective communication with the study teams and stakeholder management are also vital, as clear communication and managing expectations and involvement of stakeholders, including addressing mindset and readiness for change, are necessary for a smooth transition.

This paper also addresses the challenges that may emerge during SCE migration and provides insights into mitigating these risks. Various study designs or scenarios may require adjustments during the migration process. Another significant challenge is developing and effectively managing the migration inventory, using it as a single source of truth. Additionally, dealing with data that has access restrictions and ensuring compliance with all relevant regulations and policies throughout the migration process is crucial.

By exploring these components and challenges, this paper aims to equip you with the knowledge and tools necessary to successfully navigate the complexities of SCE migration. It will ensure a smooth transition and minimal disruption to ongoing projects and studies, ultimately setting you up for success.

Key Pillars for Success in your SCE Migration Journey

Migrating to a new SCE can be a highly complex and multifaceted process that requires meticulous planning and foresight. It is essential to prepare well in advance to ensure a smooth and successful transition to a new SCE without jeopardizing study timelines. Below are the key steps and considerations to set yourselves up for success:

1. Assembling a Migration Team: The first and foremost step in preparing for the SCE migration is to assemble a dedicated team with a deep understanding of systems, studies, processes and ways of working. This team should ideally include individuals from the pipeline, such as asset lead / study lead programmer (typically 1 or 2 from each pipeline area), technical specialists (who would build the tool to migrate), legacy and new SCE system Subject Matter experts (SME) and project manager. Their collective knowledge and collaborative work will be crucial in mapping out the migration process, identifying potential challenges, and ensuring that all aspects of legacy and new SCEs are thoroughly understood.

a. **Business Lead:** This individual would ideally be from the pipeline and would primarily be responsible for laying the groundwork for the migration process. Their key responsibilities would include developing a comprehensive migration strategy that outlines objectives, scope, timelines, and key milestones. They would draft detailed project plans, allocate resources, and coordinate tasks among team members. Collaboration with various stakeholders, including senior management, IT, data management, compliance teams, and end-users, would be essential to ensure alignment and support throughout the process. Additionally, this individual would manage an accurate inventory of all studies to be migrated, ensuring compliance with relevant regulations, policies, and security protocols. Identifying and addressing potential risks and challenges would be a critical part of their role.

b. **Pipeline Lead:** This individual would provide insights into the pipeline specific study nuances, folder structure, file naming conventions, etc. Also, the Pipeline Lead is responsible for communicating the migration messages to the study teams and providing updates to senior stakeholders within the pipeline, keeping them updated on progress and highlighting any risks. This individual actively contributes to the migration strategy, inventory build and preparing study team members for migration. It would be good to add SMEs from other departments who will use the new SCE such as Biomarker, PKPD as needed.

c. **Technical Specialists:** They provide the technical knowledge necessary for data migration, tool development and system compatibility. They also design and implement tools for seamless data transfer, perform compatibility checks, and maintain data integrity through rigorous testing and validation. Additionally, they document the migration process for audit readiness.

d. **Legacy and New SCE System SMEs:** They bring expertise in data handling, data integrity, system functionalities and details about any nuances of the legacy and new data systems. Their expertise helps in identifying potential issues and developing strategies to maintain data integrity throughout the migration process.

e. **Project Manager:** They oversee the project timelines, resource allocation, and ensure all tasks are scheduled and completed on time. They facilitate communication among team members and stakeholders, ensuring everyone is informed and aligned.

2. Strategy Build for Migration:

There are several possible strategies for migration. Here are some initial ideas:

- Migrate everything from the legacy SCE to the new SCE, focusing on one therapeutic area at a time.
- First, migrate all completed studies followed by ongoing studies based on study milestone timelines.
- Begin with non-priority studies and then migrate priority studies based on their milestone timelines.

However, migration of legacy SCE which houses hundreds of studies for possibly decades is never this straight forward, therefore it is important to develop a flexible and multifaceted migration plan.

Migration strategy will ultimately be governed by the following aspects:

- Overall timeline of migration
- Study milestones
- SCE complexity
- Speed / Limitation of the migration tool

Below is the strategy we adopted based on our requirements.

a. Overall Timeline for Migration: We had to migrate studies from the legacy SCE to the new SCE in an accelerated fashion in 9 months or less. Given the limited time available for migration, we put the following strategy in place.

- Only migrate ongoing studies and any dependent completed studies. A dependent completed study is a study that an ongoing study is dependent on for data, code, or anything else.

- All other completed studies were asked to be archived by the study team with the understanding that when the need arises to use it, it can be transferred from the archival system into the new SCE.

b. Study Milestones: The migration had to be done without jeopardizing any study timelines. Therefore, we built our strategy around study milestone as follows:

- All studies that had SAC (Statistical Analysis Complete or end of statistical analysis) in the coming year, will migrate in the current year ahead of SAC.
- All studies that have SAC in the current year will migrate in the coming year after SAC.

c. SCE Complexity: We were migrating from 3 different legacy SCEs to one new SCE. While two of the legacy SCEs had standard folder structures, the third system, originating from an acquired company, was highly non-standard. To mitigate from the non-standard legacy SCE, we flexed our ways of working and used the hybrid migration route. The hybrid migration route involved a combination of setup by the migration tool and manual migration. This was a more labor intensive and time-consuming process but at the end of the day, it ensured migration of all artifacts from legacy SCE without loss of data.

d. Speed / Limitation of Migration Tool: We started migration with the MVP (Minimum Viable Product) version of the migration tool. A MVP refers to a tool that has just enough features to be usable and accomplish its intended purpose but is not the fastest option or can handle complexity. Due to this we first started migrating to a set of 10-15 studies every 2 weeks. In the next couple of months, as the tool was made efficient and robust, we were able to kick the migration process into hyperdrive – 30 studies in a week. This strategy helped us gain the necessary momentum needed to comply with our migration timeline.

Being agile and flexible with the migration strategy is crucial, allowing adjustments as the migration progresses or when challenges arise.

3. Developing a Robust Migration Tool

The migration tool is a specialized utility developed to transfer study artifacts from the legacy SCE (source) to new SCE (destination). To ensure the effective and efficient development and operation of this tool, several key steps should be taken into consideration:

- Establish Comprehensive Requirements:** It is essential to set clear and thorough requirements that encompass the needs of all studies involved. This means understanding the specific data, formats, and conditions each study demands, ensuring that the migration tool can handle these variations seamlessly.
- Conduct Thorough Testing:** The migration tool must be rigorously tested across all relevant systems. This involves running a variety of test scenarios to identify and resolve any potential issues. Testing should simulate realworld conditions to ensure the tool performs reliably and accurately under all circumstances.
- Ensure No Data Loss:** One of the most critical aspects of the migration process is to ensure that no data is lost. This requires implementing robust data validation and verification processes before, during, and after migration. Checks should be done by the tech team (i.e. Checksum report) as well as the pipeline / study teams. Regular backups and checks should be in place to safeguard against any data discrepancies or losses.
- Maintain Flexibility and Modularity:** The migration tool should ideally be designed in a modular fashion to allow flexibility. A modular design allows individual components of the tool to be updated or replaced as needed, adding to its longevity and usability. This will allow it to be easily adaptable to accommodate any future changes or enhancements without requiring complete overhaul.
- Support Hybrid Migration:** In scenarios where a hybrid migration approach is necessary combining elements of both automated and manual processes—the tool should be capable of selectively using its components. This flexibility ensures that parts of the migration can be customized to meet specific needs, providing a tailored solution for complex migration requirements.

By focusing on these areas, the migration tool will be well-equipped to handle the intricate process of migrating study artifacts, ensuring accuracy, reliability, and adaptability throughout the migration lifecycle.

4. Documentation:

Documentation is a crucial pillar of SCE migration that must be treated with importance. Comprehensive documentation is essential for guiding the migration journey, maintaining organization, tracking progress and being ready for audits. It ensures that all tasks are followed meticulously throughout the migration journey by all parties. It includes the following key components:

- Mapping Document:** A mapping document can be a straightforward file, such as an Excel spreadsheet, that clearly indicates where each artifact (whether code or non-code) from the source will be in the destination. This document is crucial for the migration process. It should be meticulously created in collaboration with system SMEs,

thoroughly reviewed by both pipeline and technical personnel, and then distributed to both the technical team and study teams well in advance of the migration.

For the technical team, the mapping document guides them in developing the migration tool whereas for the pipeline team, it assists them in accurately locating the artifacts in the new SCE in an organized manner.

b. Pre-Migration Checklists: The pre-migration checklist is vital to ensure that the study is ready for migration. It should include tasks such as

- Data cleanup e.g.: Removal of multiple copies of any study artifact that may interfere with the workings of migration tool.
- Archiving existing completed code and non-code information where applicable.
- In the case of restricted data, ensuring all necessary approvals are obtained.
- Confirming that all team members are informed and trained.

c. Post-Migration Checklists: After the migration, the post migration checklist should be completed by 2 parties – the technical team and the study team. This checklist ensures that all migration has been completed without errors or loss of information. It should include tasks such as:

- Verifying all users have access to their study in the new SCE without issues.
- Verifying all code and non-code information has been migrated.
- Ability to open and read code and non-code information.
- Ability to re-run code and re-create outputs and verify that the results are the same. Re-running the code in the new SCE may need some modification.

Post-migration checklists help identify and rectify any problems that might have arisen during the migration process. It is very important to save evidence of post migration checklist in the archival system as proof of correct and complete migration in case of an audit. Proper archival of this documentation ensures that there is a verifiable trail of the migration process, which can be reviewed during audits to demonstrate compliance with regulatory standards and internal policies.

d. Questionnaires: When working in an agile manner, where perhaps the new SCE is not yet fully developed, the questionnaire document can be useful for collecting study requirements. This can aid the migration team in determining the optimal timing for migrating a particular study, based on the readiness of the new SCE.

e. Exception Form: The best laid plans may not be able to fit all studies, it is therefore important to have an exception form. The study teams that were unable to migrate based on the migration plan were asked to enter information in the exception form along with business rationale and proposed date of migration. This would then be reviewed by the migration team and stakeholders and a final mutually agreed proposed migration date would be recorded after consulting with the study team.

In summary, thorough documentation is a critical foundation for successful SCE migration. It ensures that all tasks are systematically outlined and adhered to, helping to maintain organization and oversight throughout the process.

5. Training and Support:

Training:

To ensure smooth migration for all studies involving multiple study team members, it is essential to develop and conduct migration journey awareness sessions.

These training sessions enable the migration team to share the step-by-step migration process, highlighting expectations at each stage to the study teams. Additionally, these sessions provide an opportunity for study team members to ask questions and have their queries addressed.

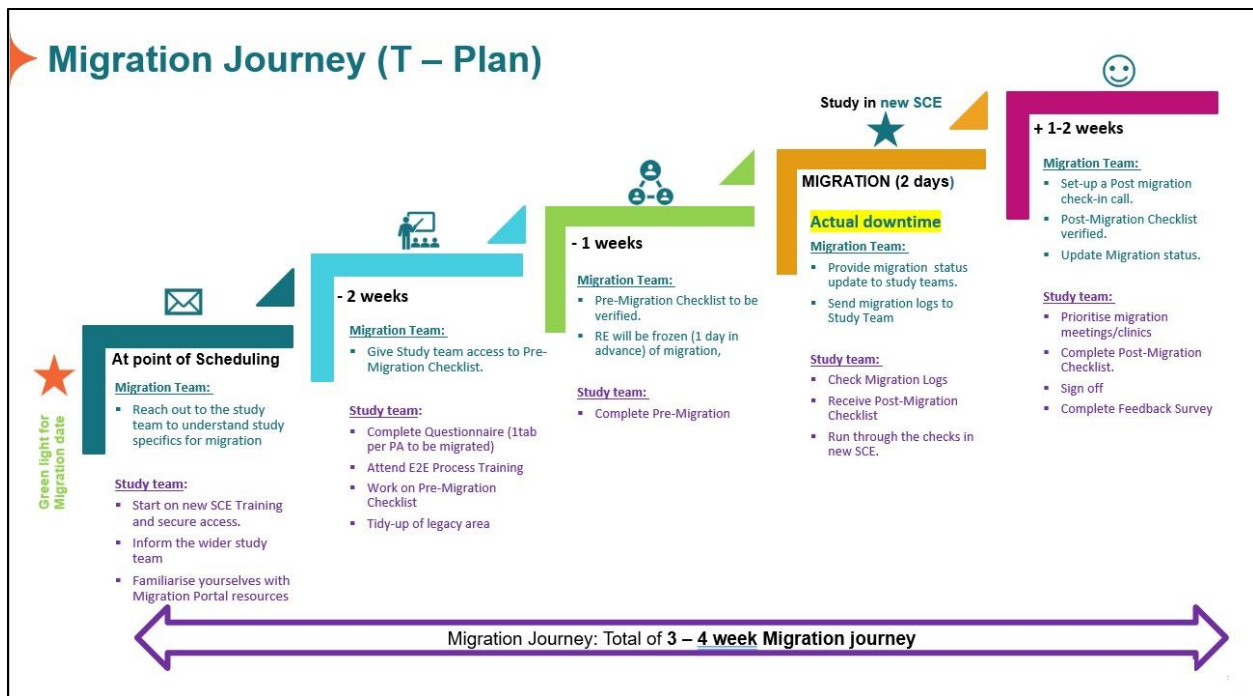
The training should ideally include

- A high-level introduction to the new SCE along with links to training courses
- A step-by-step overview of the migration journey highlighting the tasks at every step i.e. Pre-Migration, during Migration and Post Migration, etc.
- FAQ's, common mistakes, testimonials on the migration journey
- Time for interactive Q&A sessions.

This training is crucial as it prepares study teams to embrace the migration journey confidently. It minimizes the risk of errors, ensures everyone understands the migration schedule, and clarifies each member's role in it, which is essential for a successful transition. This comprehensive training boosts confidence, promotes accountability, and fosters engagement, leading to a smoother and more coordinated migration process.

At GSK, we prepared a T-Plan chart to showcase the migration journey clearly and effectively, outlining the migration process and key actions needed before, during, and after migration.

We held this training twice every week, with sessions tailored for each time zone (India/UK and UK/US). Recordings of the sessions were saved on the portal for easy access and reference.



Support:

- Portal:** The portal serves as a one-stop shop for all information related to migration. It should include details about the migration team, strategy, timeline, FAQs, training materials, testimonials and other relevant resources.
- Teams Channel (if using Microsoft Teams or similar):** Provide a collaborative platform where study team members can post questions and receive answers from SMEs. It enables real-time interaction and discussions to facilitate quick resolution of queries.
- Dedicated Email Address:** Offer a direct line of communication for study team members to send their questions and concerns. Ensure the email address is monitored by SMEs who can provide timely and accurate responses.
- Drop-in Sessions:** Provides an opportunity for study teams to ask questions and receive personalized assistance based on their specific study scenarios. Conduct regular drop-in sessions focused on the migration journey and encourage an environment of open dialogue to address any challenges the study team members may be facing.

By implementing these suggested training and support measures, you can ensure that study teams are wellprepared, informed, and confident as they embark on the migration journey to the new SCE.

6. Communications and Stakeholder Management

Communications to the study team:

Migrating to a new SCE is a significant change, and it is crucial for study teams to be well-informed ahead of time - recommend at least 3-6 months in advance.

The following factors should be considered for communications with the study teams:

- Change Aversion (Mindset):** Human beings are naturally resistant to change. This is a natural physiological reaction. Recognizing this resistance is important when planning to introduce significant changes. Providing a few months' advance notice helps team members process the information, reducing anxiety and allowing them time to understand the change and come to terms with it.
- Building a Positive Narrative:** Frame the change in a positive light by emphasizing the benefits and opportunities it will bring, such as improved efficiency, better tools, and enhanced collaboration. When people understand the positive impact and feel involved in the process, they are more likely to embrace change with a positive mindset.
- Awareness of Migration Strategy:** Create and share a detailed plan outlining the migration strategy, clearly defining the steps involved in the change process. Include specific timelines, key milestones, and

assigned responsibilities. A clear roadmap helps team members see the path forward, reducing uncertainty and anxiety about the unknown.

- **Repetition:** Research shows that humans need to hear information multiple times (approximately seven times) to effectively register it. Utilize all available platforms to propagate the message, ensuring it reaches everyone:
- **Presentations:** Present at various internal forums to spread awareness of upcoming migration.
- **Internal social media:** Post information and updates on internal social media platforms to keep the message visible and accessible.
- **Emails:** Send out regular emails with endorsements from higher management to reinforce the importance and support for migration.
- **Change Champions:** Identify and empower change champions within the organization to spread the word and advocate for migration.
- **Word of Mouth:** Encourage discussions among team members to further disseminate the information.
- **Interdepartmental Communications:** Ensure that all related departments, not just Biostats, are aware of the upcoming migration. This helps create a unified and coordinated approach across the organization. Use a combination of emails and posts on internal social media platforms to reach all relevant departments and keep them informed about the migration plans.

Stakeholder Management:

The governance model for the SCE Migration Project should adopt a structured approach to keep all stakeholders continuously informed in a seamless manner. This ensures transparency, alignment, and timely decision-making throughout the project's life cycle.

- **Communication Cadence:** At the project's inception, it is crucial to establish a clear and consistent communication schedule with senior stakeholders. This schedule should outline the frequency and format of updates (e.g., weekly meetings, bi-weekly reports, monthly reviews, etc.) to ensure everyone is on the same page.
- **Objective oriented meetings:** These regular interactions between the migration team and stakeholders serve several critical purposes:
 - i. **Share the Migration Strategy for feedback and buy-in:** Engage with pipeline heads through meetings and presentations to communicate the strategy, timelines and expected outcomes. This gives them an opportunity to raise any concerns and / or provide feedback to ensure alignment with business objectives.
 - ii. **Status Updates:** Provide regular updates on the progress of migration. This includes achievements, completed tasks, and any deviations from the plan along with reasons. Keeping stakeholders informed of progress helps maintain confidence in the project's direction and execution.
 - iii. **Risk Management:** Identify and highlight any risks to the program, i.e. any studies that are at risk of not migrating as planned. This should include a detailed description of the risks, their potential impact, and the steps being taken to mitigate them. Keeping stakeholders informed about risks and mitigation plans ensures proactive problem-solving and decision-making.

Considering the above consider a **Visual progress tracker Dashboard**. It is highly recommended to have a progress tracker dashboard i.e. Power Bi visualization to enable the migration team and senior leaders to check the progress at any time as per their convenience.

The SCE Migration Business Lead is responsible for ensuring that all stakeholders are kept updated with progress while each TA Migration Lead is instrumental in managing stakeholder relationships within their TAs and ensuring the migration project's success.

Potential Challenges During Migration:

During migration, several challenges may arise, including ensuring data integrity and compatibility between old and new systems. Considering different study scenarios ahead of time can save considerable time later. Data security must be maintained to protect sensitive information during the transfer. Additionally, managing an ever-growing inventory of data adds complexity to the migration process. Proactive planning and testing can help mitigate these challenges and ensure a successful migration.

While migrating, we had some challenges due to different scenarios like trial design, multiple legacy SCEs, nonstandard directory structures etc.

At GSK, we used GitHub for storing the code as part of the new SCE environment and all the non-code which includes logs, data, and outputs etc. It was stored on the Domino Data Lab third party platform.

a. Different Study Scenarios:

- **Platform Trials:** Within the oncology therapeutic area, we conduct platform trials that include multiple substudies. These sub-studies can report, change, and close at different times throughout the duration of the overall platform trial. The challenge was to manage these sub-studies within our inventory, facilitate their migration at various times, and establish a GitHub repository for these platform studies.

At GSK, to mitigate this issue, we structured our inventory to treat each sub-study and its deliverables as separate entries, incorporating specific flags for our technical team. For the GitHub repository, we created distinct folders for each sub-study while maintaining the company's standard folder structure to organize the code. The migration tech tool was updated to handle multiple migrations under the same study ID and to create an appropriate folder structure on GitHub.

- **Inconsistent Processes/Folders Across Departments (Mapping challenges):** Some departments, such as the PK group or the Biomarker group, which primarily conduct exploratory analyses, do not adhere to the same standards and processes on the legacy SCE. So, due to this inconsistency within the department work, it's very difficult to create a mapping and in turn a tech tool for migration for their files/data.

Depending on the volume of migration and the extent of deviation from the standard, we implemented discrete solutions such as developing a separate tech tool for migration or opting for manual migration. For example, the PK work migration proceeded as usual due to minor differences from the standard structure. However, the Biomarker team conducted their own hybrid migration.

b. Migrating Restricted Data:

Migrating restricted or sensitive study data can be quite intimidating for the migration team, as it poses the risk of compromising the integrity of study data and raises regulatory and ethical concerns. Therefore, it is essential to ensure that restricted data remains protected throughout the migration process.

Locating the restricted study folders across all the studies in the legacy SCE system is a daunting task. One approach is to ask the study team to input a specific variable in the inventory file, or you can utilize the legacy SCE metadata, which may have some Unix/Linux restrictions applied. At GSK, we used the SCE metadata to identify this information and created a flag in the inventory accordingly.

For our migration we first added flags in the inventory file to indicate which studies or folders needed to be restricted. This flag helps inform the migration and technical leads to follow the restricted folder process for access controls and creating the study folders in new SCE with proper restriction. As the migrating tech team needs access to the restricted data/files/folders, their technical functional account ID is provided read-only access to the study's unrestricted data on the legacy SCE just a couple of days before the migration, and it is immediately removed after the migration is completed. After the restricted data/files are migrated to the new SCE, the migration tech team does not provide any access to the study team to the restricted data on the new SCE, unlike the access usually given for unrestricted data. Access to the study team is granted through a formal documented request by the Project/Study statistician to the specialized access control tech team, which then provides access to only the required users. Proper access control using a defined process, documentation, and audit is required for the smooth migration of the restricted data.

c. Creating and Maintaining a Migration Inventory:

An inventory is a crucial component of any migration process. It serves as a comprehensive list of projects, studies, Planned Analyses that need to be migrated. The utmost care needs to be given to this document to ensure no important artifact from legacy SCE is left unaccounted for.

Typically, the inventory should consist of

- Study identifiers.
- Restricted data flag – Very important flag to identify if special care is needed during migration.
- Critical study milestones – This information is essential for scheduling the migration performed during noncritical times.
- Study personnel - project lead, study lead programmer etc.
- Migration planned timeline – timeframe when migration is planned
- Paths to the originating study folders – for tech tool to pull the files from legacy SCE
- Migration planned/scheduled timeline – date when pipeline and study team agreed to migrate
- Migration actual timeline – date when actual migration took place.

In creating an inventory for the migration process, it is essential to consider various sources of metadata to ensure comprehensive accounting of studies across different therapeutic areas, legacy SCEs, or different groups. The sources we utilized for our inventory included metadata from legacy SCEs, which provided detailed information on existing studies and their configurations. Additionally, we leveraged an internal study deliverable tracker called PLANIT, which served as the main source and backbone for our inventory, helping us keep track of ongoing and planned analyses for studies. We also used a nomination form, where study teams nominated themselves for migration. For studies that were archived, completed, or due to some reason not in the inventory, manual entry by the study team was necessary to capture all relevant data. Furthermore, we used legacy SCE metadata to create flags and for crossverification purposes, ensuring the accuracy and completeness of our inventory. By integrating these diverse sources of metadata, we were able to create our inventory. So, it's recommended we consider and utilize carefully all data sources available in your company to create a robust inventory to avoid manual entry as much as possible.

When building and maintaining the inventory, it is important to consider different software options that best suit your needs, such as Excel for simplicity, Microsoft Lists for advanced features and integration, or a Shiny application for an interactive interface. The software used to create the inventory can significantly impact on the efficiency and effectiveness of the migration process.

At GSK, Microsoft Lists was used to manage the inventory. Although a little slow, Microsoft Lists offers numerous built-in capabilities that enhance the management of the migration inventory. For e.g.

- It allows users to create personal views tailored to their specific needs
- Access control
- Send out alerts based on trigger factors
- Seamlessly connect to Power BI for advanced data visualization, and many more.

These features make it easier to track, manage, and visualize the progress of the migration process, ensuring that all stakeholders are kept informed, and any issues are promptly addressed.

Maintenance of the inventory is also very important. This entails regular timely updates to the inventory, schedule changes, etc. Given that the inventory is likely to be extensive, it is crucial to update and maintain it on a regular basis without any delay. Regular maintenance ensures that the inventory remains accurate and up to date, which is essential for the smooth execution of the migration plan. By keeping the inventory current, tech and pipeline teams can better manage the migration process, anticipate potential issues, and make informed decisions based on the most recent data.

Lastly, it is important that the inventory is saved in a location that is accessible to all parties involved, e.g. Migration business team, migration tech team, study teams, stakeholders, etc.

Challenges with Inventory:

In the process of creating and maintaining the inventory, several challenges were encountered. The primary challenge was ensuring that all studies, projects, and deliverables were incorporated into the inventory in alignment with our strategy, which is detailed in section 1b. The availability and accuracy of legacy SCE metadata or any internal tools posed additional concerns for constructing a robust inventory. Our inventory was primarily based on an internal tool containing most studies and deliverable information. However, the tool was not completely up to date, necessitating some manual updates as we progressed with the migration.

Additionally, the study team continued to add studies and folders for migration until the last moment, driven by the need to access old data and files from their assets and studies for integration or future submissions. Consequently, the inventory expanded in scope and volume until the end of the migration process. Nonetheless, we were able to complete the migration on time, as our technological tool efficiently accommodated the new studies and migrated a significant amount of data at high speeds.

Therefore, we strongly recommend building a robust inventory early in the migration process to ensure a smoother transition.

CONCLUSION

In conclusion, this paper emphasizes the importance of a well-prepared migration team, a detailed migration strategy, robust migration tools, comprehensive documentation, and effective training and support along with communication and comprehensive stakeholder engagement.

By maintaining a agile approach and adapting to unforeseen circumstances, we completed the migration of 305 studies/1128 planned analyses in record time of 9 months with minimal disruption to ongoing projects and studies.

In this paper, we also laid out our key challenges faced during migration, such as handling various study scenarios, managing restricted data, and maintaining an ever-growing inventory which can help readers mitigate similar challenges and in turn ensure smoother and faster migration.

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