Toronto Transit Commission (TTC) Operations & Cost Optimization Case Study

SharePoint Intranet Migration Project

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Executive Summary

The Toronto Transit Commission's (TTC) current intranet migration process from SharePoint 2016 (SP16) to SharePoint Online (SPO) is entirely manual.

This case study evaluates three alternatives to the manual migration process:

1. The SharePoint Migration Tool (SPMT),
2. SPMT combined with PnP PowerShell scripting, and
3. ShareGate, a paid third-party migration platform.

Each option was assessed using a weighted decision matrix that considered cost, oversight and reporting capabilities, and the co-op experience. ShareGate emerged as the recommended solution due to its all-in-one migration functionality, superior error tracking, comprehensive reporting, and ability to significantly reduce duplicated effort across teams. Its predictable cost structure and ease of use also align well with the TTC's operational environment, where approval cycles and training resources are limited.

However, recognizing the investment already made in manual migration and the TTC's layered approval structure, an alternate path is also proposed: enhancing the existing approach by introducing automation gradually through SPMT + PowerShell. This hybrid model allows TTC to retain completed work while incrementally improving efficiency, especially in document transfer, link updates, and permissions handling.

The report concludes that while ShareGate is the most robust and scalable solution, both options represent viable paths forward.

Background & Context

The TTC is migrating its intranet from SP16 to SPO to modernize its digital infrastructure. SP16 is an on-premises version whereas SPO is a cloud-based service. SP16 will soon reach the end of support as on-premise servers have a fixed support lifecycle and require major upgrades every few years. SPO is cloud-based, following a continuous update model and is a part of the Microsoft 365 ecosystem. As long as Microsoft supports Microsoft 365 and SharePoint as a

service, there will be no need for further migrations from SPO. TTC has been using the “classic” experience of SP16, and wants to move to the “modern” experience on SPO. Note that SPO supports both classic and modern experiences.

The migration is being conducted manually, with co-op students trained each term to carry out the process. However, the current approach presents significant inefficiencies, including system incompatibilities, error-prone document transfers, and duplicated efforts due to ongoing updates in SP16.

Key Challenges

1. Page Recreation & Compatibility Issues

- SharePoint pages rely on web parts to structure content, but SP16 and SPO do not share all the same web parts. SPO prioritizes user-friendliness, limiting certain JSON customizations available in SP16. Some web parts cannot be replicated, requiring redesign.
- SP16 uses publishing pages in the “Pages” library which are used for intranet portals and are more complex than classic pages in the “Site Pages” library. Publishing site pages are built on classic pages, and thus share most of the same UI. However, this project is to create modern pages in SPO, which have a very different UI than classic.
- Design limitations exist; for example, table lines cannot be hidden in SPO, requiring alternative formatting choices. A Standard Operating Procedure must be updated consistently and followed to ensure consistency across sites for any alternative formatting chosen.
- Each site contains 5 to 30 subsites, with many subsites having 10+ pages, further complicating the transition. Some sites contain subsites within subsites, up to 4 levels of subsites.

2. Microsoft InfoPath Forms End of Life

- Microsoft extended InfoPath form support until July 2026, with mainstream support ending in 2021.[1]
- InfoPath forms cannot be migrated manually and cannot be converted to the modern experience. Since SP16 will be decommissioned, these forms will not remain accessible unless moved. The recommended solution is to recreate them as PowerApps.[2]

3. Document Transfer Inefficiencies

- Documents are manually dragged and dropped from each SP16 site document library into SPO document library.
- Most site pages contain hyperlinks to documents in the SP16 library, requiring manual changing of each hyperlink to point to the new SPO library.
- Finding the corresponding hyperlink requires exporting the SPO document library to Excel and command finding through the hyperlink names. However, many link names do not match document names or are stored in incorrect folders, making this difficult.
- SP16 site contents are poorly organized, with documents often stored in unrelated site libraries instead of the designated Document Library. This lack of structure makes it difficult to locate specific files, requiring co-op students to use their discretion in determining where each document should be placed within SPO. Without a standardized approach, this inconsistency risks being carried over, resulting in a similarly disorganized SPO environment.
- Initially, only hyperlinked documents are migrated, necessitating the manual transfer of individual files from SP16 to SPO. This process is time-consuming, as each document must be individually located, moved, and re-linked. While migrating entire folders would significantly accelerate the workflow, it is not currently feasible due to the presence of outdated files that must first be filtered out. Attempting bulk transfers at this stage could lead to duplicate content in the new environment.
- Some legacy links do not require migration, requiring careful filtering of 100+ links on some pages to avoid unnecessary work. It is easy to miss a couple links that need rerouting from 100 links that do not.
- Many links point to other SP16 pages and sites rather than to a document. Often the linked sites are not in the migration schedule for that month or even until the end of the year. These links are highlighted and left to be rerouted for another phase of migration.

4. Duplicated Effort & Workflow Bottlenecks

- The migration is occurring in a test environment, meaning employees continue using SP16 while the transition is in progress.
- IT Service Desk receives ~4+ daily requests for SP16 updates, requiring changes to be applied to both SP16 and SPO.
- A phased migration approach leads to repeated efforts, as updates in SP16 require subsequent modifications in SPO.
- Sites migrated early in the process may require revisions or even complete restructuring as new updates are made to their SP16 versions.
- This results in double, triple, or even quadruple the workload, delaying overall progress.

Assumptions

1. Automation Enhances Value for Both Employer and Co-op

It was not possible to conduct in-depth calculations about cost increase or decrease from the co-op working on another project instead of the manual intranet migration. However, it is known that the other projects the current co-op is working on are unable to be easily automated, and the time gained from automating this project can be spent on those. Additionally, involving the student in the automation aspect of this project is arguably more valuable than the manual work they would do. TTC's co-op program emphasizes fostering a young talent pipeline from co-op to full-time employee. A University of Waterloo study highlights that giving co-op students a "perception of competence within their role" increases their intrinsic motivation and results in an increased likelihood of the student returning for their subsequent term.[3]

A comprehensive study on internship challenges revealed that while internships often enhance social skills, they frequently fail to develop technical competencies when interns are assigned basic, unrelated tasks.[4]

2. Time Spent

An average of 15 hours from a 35 hour work week is spent on manual migration. This was calculated from a 2 week sample of logging the hours spent on this project.

3. Co-op Salary

Spring 2025 TTC I.T. and Engineering co-ops range from $24.57 to $30.68 per hour. (from WaterlooWorks job portal). The rate depends on the year of studies of the student. It is assumed that the TTC I.T. Services department hires exclusively from the University of Waterloo based on researching their past co-op students, thus the calculations in this study use the $24.57 to $30.68 range. It is also assumed based on the current status that only 1 co-op student is hired each term to work on this project and that they would have the same responsibilities and thus will be spending the same 15 hours per week on this project. TTC is a government agency and therefore would not benefit from the tax deduction for hiring co-op students. It is assumed that there are no other subsidies received for employing co-ops.

4. Co-op On-boarding

An estimate for the on-boarding process of a new co-op is dependent on the ease of use of each potential new solution. It is assumed that a new co-op is on-boarded each term and thus this time is accounted for every 4 months.

5. Full-time Employee Cost

The exact number of employees involved in this project, along with their salaries and time allocation, is unknown. Therefore, cost calculations are based solely on co-op work and salaries. However, any increase or decrease in project costs would similarly apply to full-time employees, as they are driven by hours spent, which would scale accordingly for both groups.

6. Time per Phase

The time for each phase is estimated based on first-hand knowledge about the migration process and research on the new tools.

7. Data Estimate

An estimated 30 TB of data within SharePoint is assumed for migration. This includes pages, InfoPath forms, and back-end content such as document libraries and lists.

This figure is derived based on the following:

- An average of 10 GB per employee, with ~4,000 non-union (corporate) employees expected to use the new intranet portal.[5]

- Industry benchmarks from intranet migrations at large enterprises such as Coca-Cola Hellenic and Maersk, where intranet portal sizes ranged from 10–25 TB.[6]

- Consideration of decades of historical records requiring preservation.

This conservative 30 TB estimate informs the timeline and batching strategy for incremental migration across all proposed solutions. Even if the 30 TB estimate is inaccurate, the migration timelines for all solutions would scale proportionally. This means the overall comparison and analysis remain valid and only the projected durations would adjust based on the actual data volume. 25 out of the 30 TB is assumed to be back-end site content and 5 TB is site pages.

Decision Criteria

A weighted decision matrix is used for comparing the various alternatives to manual migration.

Criteria	Weight
Cost	6
Project Oversight & Reporting	3
Co-op Experience	1

*Notes:

1. *The cost criterion refers to the cost of executing the project using this tool, not the tool's purchase price.*
2. *Assigned a low weight based on Assumption 1 that there are other tasks for co-ops to do other than this project.*

Manual (Current) Approach

Time Estimation

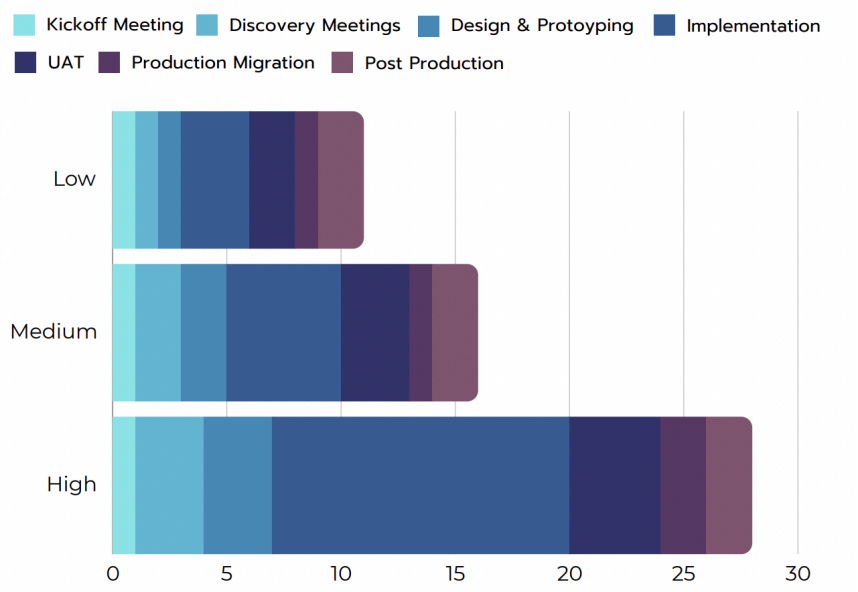
Total sites: 63
Sites migrated per week: 1 (worst case) to 2 (best case)
Estimate for manually migrating InfoPath Forms to PowerApps:

Table 1: Time Estimate for InfoPath Forms[7] [8]

Task	Estimated Time	Details
Assessment & Planning (bulk)	6 weeks	Develop a detailed inventory of forms to be migrated, including associated libraries/lists. PowerShell scripting can assist with automation.
Migrate Data	8 weeks	Migrate InfoPath data to XML or CSV. Use Power Scripts or custom scripts to extract metadata and move list/library content to SharePoint Online.
Form Redesign in Power Apps	5 weeks	Rebuild form UIs using Power Apps' drag-and-drop builder, incorporating conditional formatting and logic as needed.
Business Logic Implementation	5 weeks	Recreate workflows, validations, and integrations with SAP via Power Automate or custom connectors.
Deployment & Training	4 weeks	Launch the new application in production and provide training sessions for end users.

Total ~28 weeks to convert InfoPath forms into PowerApps[9]

Figure 1: Potential Timeline for Migrating Different Complexity Forms[10]



Cost

Migration Schedule:

Phase 1: Planning migration (8 weeks)
Phase 2: Initial migration (2-3 sites/week), simultaneously migrating InfoPath Forms (28 weeks).
Phase 3: Re-migrating sites based on SP16 updates (often includes recreating entire sites) (3-4 sites/week)

Phase 4: Cleaning up document libraries and migrating to SPO. (12-16 weeks)
Phase 5+: Further iterations to sync with SP16 updates, updating hard-coded links, manual verification of migration, and troubleshooting. (12-14 weeks)

Co-op Training Time:

- Manually creating site pages is easy given the web parts in SPO, doesn't require programming knowledge
- Document and other site migration requires time to get familiar with the system
- ~3 weeks training for each co-op term before they can start migrating content

Phase 1: Planning Migration

Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
8	120	$2,948.40	$3,681.60

Phase 2: Initial migration while migrating InfoPath Forms

- Best Case: max(21, 28) = 28 weeks
- Worst Case: max(32, 28) = 32 weeks

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	28	420	$10,319.40	$12,885.60
Worst Case	32	480	$11,793.60	$14,726.40

Phase 3: Re-migrating sites based on SP16 updates

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	16	240	$5,896.80	$7,363.20
Worst Case	21	315	$7,736.55	$9,660.60

Phase 4: Cleaning up document libraries and migrating to SPO

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	12	180	$4,422.60	$5,522.40
Worst Case	16	240	$5,896.80	$7,363.20

Phase 5+: Further iterations, link updates, verification, troubleshooting

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	12	180	$4,422.60	$5,522.40
Worst Case	14	210	$5,159.70	$6,442.80

Cost Summary (Including Training Time)

Scenario	Hourly Rate	Total Weeks	Co-op Terms	Training Weeks	Adjusted Total Hours	Total Cost
Best Case	$24.57	76	~5	15	61	$33,906.60
Worst Case	$30.68	91	~6	18	73	$50,161.80

<u>Project Oversight and Reporting</u>

- Co-op reports to the PM directly about the number of sites updated per week and any issues with the project (what could/could not be migrated, alternative web parts chosen, etc.)
- Timeline estimation for this project based on co-op's work speed and reporting
- Manual migration introduces a high risk of errors that can significantly disrupt timelines. For instance, it was only after 8 of the 63 subsites had been migrated that a critical issue was identified: sites were mistakenly being created as pages rather than proper subsites in SharePoint Online. Despite oversight, the error went undetected for an extended period due to the nuanced structure of SharePoint and the manual nature of the process. To correct this, a Power Automate workflow was developed to reconfigure each page into a subsite and assign it as the corresponding homepage. Document transfers now also follow this workflow to ensure content is placed within the correct subsite structure rather than the general page library. This oversight and its resolution have collectively delayed the project by approximately two months.

<u>Co-op Experience</u>

- Familiarity with SharePoint can be an asset for future jobs
- Redundant and unfulfilling task can result in decreased likelihood of the co-op returning for a future term (see Assumption 1)

Assessment of Migration Alternatives

1. SharePoint Migration Tool (SPMT)

- **Free of Cost:** Built-in tool that supports migration at no additional cost.
- **Bulk Content Migration:** Seamlessly migrates back-end site content (document libraries, lists, etc.) using CSV and JSON files. Files must be manually configured and mapped.
- **Site Page Limitation:** Cannot migrate pages from SP16, as they are publishing sites built on classic sites stored in the Pages library. SPMT does not support Pages library migration or the conversion of classic pages (SP16) to modern pages (SPO). SPO supports both classic and modern pages, but this project is to create modern pages in SPO. Thus, pages have to be manually recreated as modern pages in SPO.
- **Metadata & Permissions Constraints:** Not designed to migrate complex metadata, permissions, or version history. Supports bulk permissions migration via CSV/JSON files, though it has limitations, such as incomplete group migration and the inability to transfer inherited or custom permissions.[11]
- **Migration Management:** Requires manual configuration for each migration batch, with a limit on the number of batches that can run simultaneously.[12]
- **Pre & Post-Migration Assessment:** SharePoint Migration Assessment Tool (SMAT) provides reports on migration impact to assist in planning before execution and after each task (file count, speed, estimated completion time).[13] [14]
- **InfoPath Forms**: Same as manual approach (convert to PowerApps).

Time Estimation

Total sites: 63
Sites migrated per week: 2-3 sites/week (more than manual since back-end is automated)
Time to migrate back-end:

Based on Assumption 7 that 30 TB of data needs to be migrated and 25 TB is back-end content. Heavy metadata (ex. Lists with custom columns, small files, etc.) takes 250 GB/day to migrate. This results in 100 days to migrate 25 TB and ~10 days for manually configuring each of the batches.[15] [16]

Time to migrate InfoPath Forms: 28 weeks (same as manual)

Cost

Migration Schedule:

Phase 1: Planning and getting permissions (12 weeks)
Phase 2: Clean-up of site contents (documents, lists, libraries) before migrating. (4-6 weeks)
Phase 3: Simultaneously migrating sites manually, migrating InfoPath Forms, and SPMT back-end migration (2-3 sites/week, 110 days (22 weeks) for back-end, 28 weeks for forms)
Phase 4: Remigrating sites based on updates (3-4 sites/week)
Phase 5: Further iterations to sync with SP16 updates, updating hard-coded links, troubleshooting (6-8 weeks)

- Less time since more sites are migrated in less time so less SP16 updates to sync with;
- SPMT generates reports pre and post-migration reports, thus reducing time for manual troubleshooting

Co-op Training Time:

- Manually creating site pages is easy given the web parts in SPO do not require programming knowledge
- SPMT GUI is easy to use with a step-by-step wizard and no code required
- ~2 weeks training for each co-op term before they can start migrating content (less time than manual since there is no need to learn SP16 and SPO back-end migration)

Phase 1: Planning and getting permissions

Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
12	180	$4,422.60	$5,522.40

Phase 2: Clean-up of site contents

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	4	60	$1,474.20	$1,840.80
Worst Case	6	90	$2,211.30	$2,761.20

Phase 3: Simultaneously migrating sites manually, InfoPath Forms, and SPMT back-end migration

- Best Case = max(21, 22, 28) = 28 weeks
- Worst Case = max(32, 22, 28) = 32 weeks

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	28	420	$10,319.40	$12,885.60
Worst Case	32	480	$11,793.60	$14,726.40

Phase 4: Re-migrating sites based on updates

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	16	240	$5,896.80	$7,363.20
Worst Case	21	315	$7,736.55	$9,660.60

Phase 5+: Further iterations, link updates, troubleshooting

Case	Weeks	Total Hours	Cost ($24.57)	Cost ($30.68)
Best Case	6	90	$2,211.30	$2,761.20
Worst Case	8	120	$2,948.40	$3,681.60

Cost Summary (Including Training Time)

Scenario	Hourly Rate	Total Weeks	Co-op Terms	Training Weeks	Adjusted Total Hours	Total Cost
Best Case	$24.57	66	~4	8	61	$27,272.70
Worst Case	$30.68	79	~5	10	73	$40,957.80

Project Oversight and Reporting

- Summary Reports: Track total bytes/GB migrated, success/failure rates, and duration
- Task-Level Reports: Drill into individual migration tasks with details like error messages, skipped items, and log paths[17]
- Performance Metrics: Scores for source read speed, disk performance, and SharePoint throughput help optimize migration workflows[18]
- Error/Warning Logs: Identifies failed items (e.g., unsupported file types, permission issues) with actionable details
- Log Paths: Direct links to detailed logs for compliance reviews
- Workflow/Task IDs: Traceability for troubleshooting and accountability

Co-op Experience

- Familiarity with SharePoint can be a valuable asset for future work terms
- Task is slightly less redundant as site content back-end migration is automated, increasing likelihood of the co-op returning for a future term than complete manual migration

2. SharePoint Migration Tool (SPMT) + PnP PowerShell

- **Free of Cost:** PnP PowerShell cmdlets leverage the SPMT migration engine to address most of SPMT's limitations.[19]
- **Classic to Modern Page Transformation:** Supports semi-automated conversion of classic SP16 publishing pages to modern pages in SPO using the PnP Page Transformation Tool.[20] [21] [22] Need to use custom mapping files to map publishing site content to modern site content.[23] Use SharePoint modernization scanner to see which publishing features are used, and get an analysis of the readiness for migration for these 3 categories: "Microsoft 365 group connection", "Page transformation" and "Publishing Portal Modernization".[24] While possible through scripting, it is recommended to manually recreate Home pages (home.aspx). Also supports migrating JSON-customized pages and complex web parts through scripting.

Table 2: List of Page Types vs SharePoint Versions Supported by PnP Page Transformation Tool[25]

Page Type	SharePoint 2010	SharePoint 2013	SharePoint 2016	SharePoint 2019	SharePoint Online
Wiki page	x	x	x	x	x
Webpart page	x	x	x	x	x
Blog page	x	x	x	x	x
Publishing page	x	x	x	x	x

- **Automated Batch Scheduling:** Allows migration to be scheduled in batches, optimizing execution during off-peak hours for minimal disruption.[26]
- **Advanced Permissions Handling:** Supports cross-domain group mapping, inherited and custom permissions, and can rebuild broken inheritance. Bulk migration of permissions can be automated through post-migration scripting.[27] [28]

- **Automated Link Updating:** Automatically updates hardcoded links in pages to point to the new SPO library. This process can be:
    - **Scripted:** Uses a CSV file to map old SP16 links to their new SPO equivalents. A script iterates through each page, identifies outdated links, and replaces them accordingly.[29]
    - **No-Scripting Alternatives:** Avoid manual link mapping by using Broken Link Manager, Replace Magic, or LinkTek's LinkFixer Advanced for automated link corrections.

Table 3: Link Automation Features Supported by Paid Softwares[30] [31]

Feature	Broken Link Manager (Cognillo)	Magic LinkFixer (LinkTek)	LinkFixer Advanced (LinkTek)
SharePoint Page Links	✓ Fixes links in SharePoint pages	✓ Fixes links in SharePoint pages	✓ Fixes links in SharePoint pages
Document-Level Links	✗ Not supported	✓ Handles Office files and PDFs	✓ Handles Office files and PDFs
Automation for Fixing Links	✓ Rule-based automation	✓ Search-replace pairs	✓ Search-replace rules
Pre-Migration Link Protection	✗ Not supported	✗ Not supported	✓ Protects links before migration
Bulk Operations	✓ Scans entire site collections	✓ Scans documents and pages	✓ Scans thousands of files at once
Ease of Use	GUI-driven	GUI-driven	GUI-driven
Cost	$2,995/year for Professional Plan (Part of SharePoint Essentials Toolkit)	Company license is $1,995.00	Pricing not publicly available; contact LinkTek

LinkFixer Advanced is likely the most expensive solution based off of this Reddit thread that suggests their pricing model is based on the number of company employees at an organization, regardless of how many of them would be benefiting from or involved in the migration process. Considering that the TTC has 17,000 employees, this would not be a feasible option. Broken Link Manager and Replace Magic work for the purposes of this task. While Broken Link Manager meets the requirements, its bundled migration features do not justify the additional $1,000 cost. In contrast, Replace Magic, priced at $1,995, offers an effective and cost-efficient solution for automated link updating.

- **InfoPath Forms**: The recommended solution is to convert InfoPaths to PowerApps to continue using them once SP16 is decommissioned. SPMT cannot automate this task, but SharePoint Migration Assessment Tool (SMAT) generates InfoPath-detail.csv to identify

forms needing remediation and categorizes the forms by complexity to aid in migration planning. This helps create an inventory of all forms that need to be migrated, which is essential for the assessment and planning phase.[32]

Time Estimation

Total sites: 63
Site pages and back-end migration:

Based on Assumption 7 that 30 TB of data needs to be migrated. Heavy metadata (ex. Lists with custom columns, small files, etc.) takes 250 GB/day to migrate. This results in 120 to migrate 30 TB of site pages and back-end content.

InfoPath Forms: 26 weeks (2 weeks reduced from assessment and planning phase since SMAT generates inventory report)

Cost

Migration Schedule:

Phase 1: Planning and getting permissions (12 weeks)
Phase 2: Clean up site contents (document library, lists, etc.) (4-6 weeks)
Phase 3: Write and plan scripts for automating site pages and back-end migration (4-6 weeks for planning + 120 days (24 weeks) for batching). Simultaneously convert InfoPath Forms to PowerApps (26 weeks)
Phase 4: Remigrating sites based on SP16 updates (1 week)
Phase 5: Scripted link updating (6-8 weeks) or Replace Magic link updating (1-2 weeks)
Phase 6: Post-migration scripting (for JSON customized sites, migrating permissions and metadata, etc.) (6-8 weeks)
Phase 7: Troubleshooting (4-6 weeks)

- Mostly done via scripting, so less chance for manual errors
- SPMT generates post and pre-migration reports

Co-op Training

- PowerShell scripting and using SharePoint cmdlets requires a quick learner with programming experience.
- Assuming this method of migration would be done by co-ops, training will take ~4 weeks.

Phase 1: Planning and getting permissions

Weeks	Hours	Cost ($24.57)	Cost ($30.68)
12	180	$4,422.60	$5,522.40

Phase 2: Clean up site contents

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	4	60	$1,474.20	$1,840.80
Worst Case	6	90	$2,211.30	$2,761.20

Phase 3: Script planning + batching and InfoPath to PowerApps

- Planning (4–6 weeks) overlaps with 24 weeks of batching
- Longest duration = max(24, 26) = 26 weeks

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	26	390	$9,588.30	$11,565.20
Worst Case	26	390	$9,588.30	$11,565.20

Phase 4: Remigrating sites based on SP16 updates

Weeks	Hours	Cost ($24.57)	Cost ($30.68)
1	15	$368.55	$460.20

Phase 5A: Scripted link updating

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	6	90	$2,211.30	$2,761.20
Worst Case	8	120	$2,948.40	$3,681.60

Phase 5B: Replace Magic link updating

Case	Weeks	Hours	Wage Cost ($24.57)	Wage Cost ($30.68)	+ Tool	Total ($24.57)	Total ($30.68)
Best Case	1	15	$368.55	$460.20	$1,995	$2,363.55	$2,455.20
Worst Case	2	30	$737.10	$920.40	$1,995	$2,732.10	$2,915.40

Phase 6: Post-migration scripting

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	6	90	$2,211.30	$2,761.20
Worst Case	8	120	$2,948.40	$3,681.60

Phase 7: Troubleshooting

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	4	60	$1,474.20	$1,840.80
Worst Case	6	90	$2,211.30	$2,761.20

Using Replace Magic would be more cost-effective overall, as the reduction in manual labor offsets the licensing fee. As a result, it is included in both the best- and worst-case cost estimates.

Cost Summary (Including Training Time)

Scenario	Hourly Rate	Total Weeks	Co-op Terms	Training Weeks	Adjusted Total Hours	Total Cost
Best Case	*Included Tool Fee*	54	~4	16	38	$25,798.50
Worst Case	*Included Tool Fee*	61	~4	16	45	$35,435.40

<u>Project Oversight and Reporting (same as SPMT method)</u>

- No additional challenges or benefits of using PowerShell

<u>Co-op Experience</u>

- Will gain familiarity with SharePoint in a more technical aspect

- Challenging to learn scripting and troubleshooting, however challenge can increase job satisfaction and provide the co-op with valuable experience

3. ShareGate

- **Cost**: ShareGate Pro starts at 9,995 and ShareGate Enterprise at 17,995. The only difference between Pro and Enterprise is the number of machine activations for concurrent migrations; Pro has 5 while Enterprise has 25.[33]
- **Classic to Modern Page Migration**: ShareGate cannot directly convert classic SharePoint pages to modern in SharePoint Online (SPO). However, unlike PowerShell, ShareGate can migrate Home pages.[34]
    - **Workaround (PnP PowerShell):**

      Step 1: Migrate classic pages using ShareGate's Copy Structure and Content. These will remain classic in SPO under the Pages library.[35]

      Step 2: Use the PnP Page Transformation Tool to convert them to modern pages in the Site Pages library. (see SPMT + PnP PowerShell section for resources)

      Alternatively, convert pages to modern in SP16 first, then migrate with ShareGate.

- **Incremental Bulk Migrations**: Enables scheduled, incremental bulk migrations.[36] (Step-by-step scripting guide)
- **Insane Mode** (for SPO migrations): Uses Azure storage to package and transfer data, reducing throttling and improving speed. Works only for the "Copy content only" option, not to be used with "Copy structure and content." Should be used for migrating back-end content only.[37]

Table 4: Features Supported by Insane v.s. Normal Mode

Factor	Insane Mode	Normal Mode
ASPX Page Support	❌ Not supported	✓ Supported
Speed	2–3 TB/day (documents)	250 GB/day (pages)
Throttling	Minimal due to Azure API	Significant during peaks
Error Handling	Automated retries	Manual intervention

- **Concurrent Migrations**: Supports up to 25 simultaneous migration machines, significantly reducing batch processing time.
- **No duplicates**: Transfers only changed/updated files since the previous migration, minimizing downtime and redundancy.[38]
- **Permissions & Metadata Handling**
    - **Compared to SPMT**:
        - SPMT only migrates default SharePoint groups, thus missing inherited, custom, and special permissions like "Deny."
        - ShareGate migrates all unique permissions and metadata through a simplified CSV file where you only need two columns in your spreadsheet to map the SourceValue and the DestinationValue.
        - ShareGate supports copying permissions from one user to another if an employee is being replaced.[39]
- **Automate Link Updating:** Update Links feature automatically updates hyperlinks in migrated SPO pages. Modern web part links are relative by default and do not require the Update Links toggle to even be on.[40] [41]
- **Customer Support & Resources**:
    - ShareGate provides a dedicated support team, training modules, and video guides to assist with migration and simplify PowerShell scripting. Can book a free consultation and call and have access to resources for help with migration rather than self-learning with SPMT and PowerShell.[42]
- **InfoPath Forms**:
    - Though InfoPath forms are incompatible with modern SharePoint, ShareGate can still migrate them to run in the classic experience.[43]
    - However, it is recommended to convert them to PowerApps which ShareGate cannot do. (refer to SPMT + PnP PowerShell on how to do this)
- **Comprehensive Pre/Post-Migration Reports**: Below shows a comparison between SharePoint Migration Assessment Tool (in-built SPMT) and ShareGate's assessment system:

Table 5: Pre-Migration Assessment[44] [45]

Feature	ShareGate	SPMT
Scope	Scans permissions, users/groups, site architecture, workflows, metadata, and unsupported features.	Focuses on content inventory and basic risk codes.
Actionable Insights	Provides detailed remediation steps (e.g., user mapping, template fixes) via GUI-driven reports.	Lists risks (e.g., unsupported features) but lacks step-by-step guidance.
Simulation	Runs a full migration simulation without moving data, identifying issues upfront.	Limited to basic scans without simulating migration workflows.
Complexity Handling	Identifies dependencies (e.g., lookup columns, Nintex workflows) and metadata conflicts.	Flags unsupported features but lacks dependency analysis.

Table 6: Post-Migration Assessment

Feature	ShareGate	SPMT
Error Resolution	Offers bulk tools to fix broken links, permissions, and metadata post-migration.	No post-migration tools; errors must be resolved manually.
Reporting	Generates granular reports for auditing permissions, metadata, and user activity.	Provides basic migration logs without advanced analytics.
Reorganization	Supports post-migration restructuring (e.g., merging sites, flattening folders).	Limited to content transfer without reorganization features.

Side-by-Side comparison of SPMT and ShareGate

Time Estimation

Total sites: 63
Site pages and back-end migration:

Based on Assumption 7, a total of 30 TB of data needs to be migrated, of which 25 TB is back-end data. This portion can leverage ShareGate's Insane Mode with Azure Blob Storage, which uses parallel uploads to bypass throttling and achieves a transfer rate of approximately 2–3 TB per day. In the worst case, migrating 25 TB would take around 15 days.[46] [47]

The remaining 5 TB consists of pages, which must be migrated using Normal Mode due to their structure. Normal Mode is limited to approximately 250 GB per day, resulting in 20 days for migration.

Total time: 35 days

InfoPath Forms (migrated to SPO without converting to PowerApps): ~2 weeks
InfoPath Forms (converted to PowerApps): ~26 weeks (same as SPMT + PnP PowerShell)

Cost

Migration Schedule:

Phase 1: Planning and getting permissions (12 weeks)
Phase 2: Clean up site contents (document library, lists, etc.) (4-6 weeks)
Phase 3: Migrate classic publishing sites (20 days for batching)
Phase 4: Start back-end migration while simultaneously writing and planning scripts for PnP Page Transformation Tool. (4-6 weeks for planning + 23 days for batching (4 weeks)). Simultaneously convert InfoPath Forms to PowerApps (26 weeks) if converting to PowerApps or using ShareGate and keeping in Classic mode (2 weeks)
Phase 5: Remigrating sites based on SP16 updates (1 week)
Phase 6: Troubleshooting (3-5 weeks)

- ShareGate Assessment Tool provides detailed steps when there is an error, reducing time for troubleshooting
- No duplicate sites are generated
- Support with troubleshooting results in less time troubleshooting

Co-op Training:

- ShareGate automates most tasks, but ~2 weeks training for the limited PowerShell scripting required

Phase 1: Planning and getting permissions

Weeks	Hours	Cost ($24.57)	Cost ($30.68)
12	180	$4,422.60	$5,522.40

Phase 2: Clean up site contents

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	4	60	$1,474.20	$1,840.80
Worst Case	6	90	$2,211.30	$2,761.20

Phase 3: Migrate classic publishing sites

Weeks	Hours	Cost ($24.57)	Cost ($30.68)
4	60	$1,474.20	$1,840.80

Phase 4: Back-end migration + scripting + InfoPath conversion

- PowerApps: 26 weeks (longest task dominates)
- ShareGate (Classic mode): 4 weeks (overlap matches shortest)

Option	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Power Apps	26	390	$9,588.30	$11,565.20
ShareGate (Classic Mode)	4	60	$1,474.20	$1,840.80

Phase 5: Remigrating sites based on SP16 updates

Weeks	Hours	Cost ($24.57)	Cost ($30.68)
1	15	$368.55	$460.20

Phase 6: Troubleshooting

Case	Weeks	Hours	Cost ($24.57)	Cost ($30.68)
Best Case	3	45	$1,105.65	$1,380.60
Worst Case	5	75	$1,842.75	$2,301.00

Cost Summary (Including Training Time)

Scenario	Hourly Rate	Total Weeks	Co-op Terms	Training Weeks	Adjusted Total Hours	ShareGate License	Total Cost
Best (Power Apps Forms)	$24.57	50	~3	6	44	$9,995	$30,633.80
Best (ShareGate Migration)	$24.57	18	~2	4	14	$9,995	$18,103.10
Worst (Power Apps Forms)	$30.68	56	~4	8	48	$9,995	$39,447.80
Worst (ShareGate Migration)	$30.68	34	~3	6	28	$9,995	$28,403.00

Project Oversight and Reporting

- Inventory Reports
- Centralized dashboards and batch tracking including percentage completed and estimated time of completion
- Detailed error reports with remediation steps and step-by-step guidance by ShareGate support team
- Comprehensive activity logs for auditing and traceability

Co-op Experience

- Learning governance and best practices
- Limited technical learning except for some PowerShell scripting

Summary of Processes

Table 7: Compatibility of Processes with Migration Features

Feature / Compatibility	Manual	SPMT	SPMT + PowerShell	ShareGate
Back-End Content Migration	✅ Manual drag-drop	✅ Automated	✅ Automated via scripting	✅ Automated via GUI
Classic to Modern Page Migration	❌ Manual recreate	❌ Not supported	✅ Semi-automated via PnP	✅ Supported via PnP
Supports Publishing Pages	✅ Manual recreate	❌	✅ Custom mapping files	✅ Home pages directly
Document Link Updating	❌ Manual rewrite	❌ Manual rewrite	✅ Scripted/Replace Magic	✅ Built-in link tool
Handles InfoPath Forms	❌ Recreate manually	❌ Convert manually	✅ Convert to Power Apps	❌ Convert externally
Metadata & Permissions Migration	❌ Manually reset	⚠️ Limited (CSV)	✅ Advanced scripting	✅ GUI-based migration
Pre/Post Migration Reports	❌ None	⚠️ Basic logs	✅ Scripted & SMAT logs	✅ Full dashboards
Error Logging & Resolution	❌ Manual tracking	⚠️ Limited logs	✅ Scripted logging	✅ GUI remediation
Link Protection	❌	❌	⚠️ With Replace Magic	✅ Pre/post support
Batch Scheduling / Automation	❌	⚠️ Limited	✅ PowerShell automation	✅ Concurrent batching
Training Required	Low (3 weeks)	Low (2 weeks)	High (4 weeks)	Low (2 weeks – GUI)
Cost of Tool	✅ Free	✅ Free	✅ Free (~$2K optional)	❌ $9,995 license
Cost of Project	Highest	Second Highest	Lowest	Second Lowest
Project Oversight	❌ Very limited	⚠️ Moderate	✅ Detailed if scripted	✅ Best-in-class
Co-op Experience	❌ Redundant	✅ Simple exposure	✅ Strong technical	⚠️ Limited challenge

Recommendation

Decision Matrix Evaluation

Criteria	Weight
Cost	6
Project Oversight & Reporting	3
Co-op Experience	1

Cost

Solution	Score (1–5)	Weighted Score
Manual	1	6
SPMT	2	12
SPMT + PowerShell	4	24
ShareGate	4	24

ShareGate scores higher than SPMT + PowerShell because its worst-case cost scenario is still lower and more predictable than PowerShell's worst-case.

Project Oversight and Reporting

Solution	Score (1–5)	Weighted Score
Manual	1	3
SPMT	2	6
SPMT + PowerShell	2	6
ShareGate	5	15

ShareGate offers the most comprehensive dashboards, error tracking, simulation, and remediation steps.

Co-op Experience

Solution	Score (1–5)	Weighted Score
Manual	2	2
SPMT	2	2
SPMT + PowerShell	5	5
ShareGate	3	3

PowerShell provides the strongest technical learning for co-ops, while ShareGate's automation reduces the challenge but still involves light scripting.

Total Scores

Solution	Total Score
Manual	11
SPMT	20
SPMT + PowerShell	37
ShareGate	38

The decision matrix clearly shows that ShareGate narrowly outperforms SPMT + PowerShell by a single point, driven primarily by its superior project oversight and built-in reporting tools. Both solutions vastly outperform the manual and SPMT-only approaches in all three decision criteria: Cost, Project Oversight, and Co-op Experience. Thus, the decision realistically narrows to a head-to-head comparison between ShareGate and SPMT + PowerShell.

However, the outcome is nuanced and should be informed by strategic considerations, organizational constraints, and future-proofing priorities, not just weighted scoring.

Other Considerations

1. Long-Term Scalability & Stability

ShareGate’s GUI-driven tools, detailed logs, and simulation capabilities greatly reduce the likelihood of critical errors in large-scale migrations. Given that TTC is migrating over 60 sites and 30 TB of data, even a 1% error rate could have massive ripple effects. ShareGate’s robust preemptive assessment and remediation tools mitigate this risk, which is especially valuable given TTC's complex intranet architecture.

2. Organizational Permissions and IT Bureaucracy

A key bottleneck cited throughout the case study is the time required to obtain IT approvals for new tools and scripts. ShareGate’s all-in-one licensing and minimal configuration make it more easily defensible as a complete solution during approval processes. In contrast, PowerShell-based solutions may require multiple layers of internal review for script deployment, JSON permission mapping, and automation workflows.

Final Recommendations

After a comprehensive assessment of the three proposed migration methods: manual migration, SharePoint Migration Tool (SPMT) with PowerShell scripting, and ShareGate, it is recommended that the TTC adopt **ShareGate** as the primary solution to transition their intranet from SP16 to SPO.

This recommendation is based on ShareGate's balance of automation, reporting capabilities, and cost predictability. ShareGate streamlines complex migrations through an intuitive interface, reducing the likelihood of errors and minimizing the need for extensive training. Its pre- and post-migration dashboards offer granular visibility into process outcomes, equipping both project managers and IT stakeholders with actionable insights. Compared to the manual approach, ShareGate significantly reduces duplicated efforts and timelines, and unlike SPMT-only solutions, it simplifies permission mapping, metadata transfers, and incremental migrations without requiring extensive custom scripting.

While PowerShell provides greater technical depth and a steeper learning curve that may appeal to certain co-op students, the overall project efficiency and error mitigation achieved through ShareGate outweigh this benefit. Moreover, the upfront cost of ShareGate is offset by reduced training time, faster migration speeds, and lower rework rates. As TTC is operating under strict time and resource constraints, a scalable and dependable solution like ShareGate is essential for long-term digital infrastructure modernization.

That said, adopting ShareGate does not mean the work completed thus far must be discarded. Pages already recreated manually in SPO can remain as-is, serving as reference templates or pilot models for future site configurations. ShareGate's flexibility allows targeted migrations for remaining sites and back-end content, while preserving previously migrated components.

Alternative Recommendation:

If a full adoption of ShareGate for migration is not favoured, a phased enhancement of the current manual approach is recommended using **SPMT + PnP PowerShell**.

This hybrid model retains the progress made in manual site builds while gradually introducing automation in key areas such as:

- Back-end content migration via SPMT, significantly accelerating document library and list transfers.

- Link updating and permission mapping through PowerShell scripts or lightweight no-code tools such as Replace Magic.

- Classic to modern page transformations using the PnP Page Transformation Tool, particularly for complex publishing sites that are not yet migrated.

This approach builds upon existing workflows, reduces redundant effort, and minimizes training disruption for co-op students, who are already familiar with the manual process. Moreover, PowerShell integration introduces automation gradually, aligning with TTC's bureaucratic structure where new tools require extended approval periods. Over time, this hybrid model can be scaled up or transitioned to a full ShareGate-based solution as more permissions and budget flexibility are secured.

Conclusion

Modernizing TTC's intranet requires a solution that not only addresses the technical complexity of SharePoint migration, but also fits within organizational realities such as co-op onboarding cycles, approval bottlenecks, and stakeholder oversight. ShareGate offers the most comprehensive and scalable solution, optimizing time, cost, and quality assurance while improving the co-op experience through manageable automation. However, if full transition is not immediately feasible, enhancing the existing manual framework through SPMT and PowerShell provides a practical and incremental path forward. This dual-path strategy ensures that regardless of constraints, TTC can continue to progress toward an efficient, future-proof digital workplace.