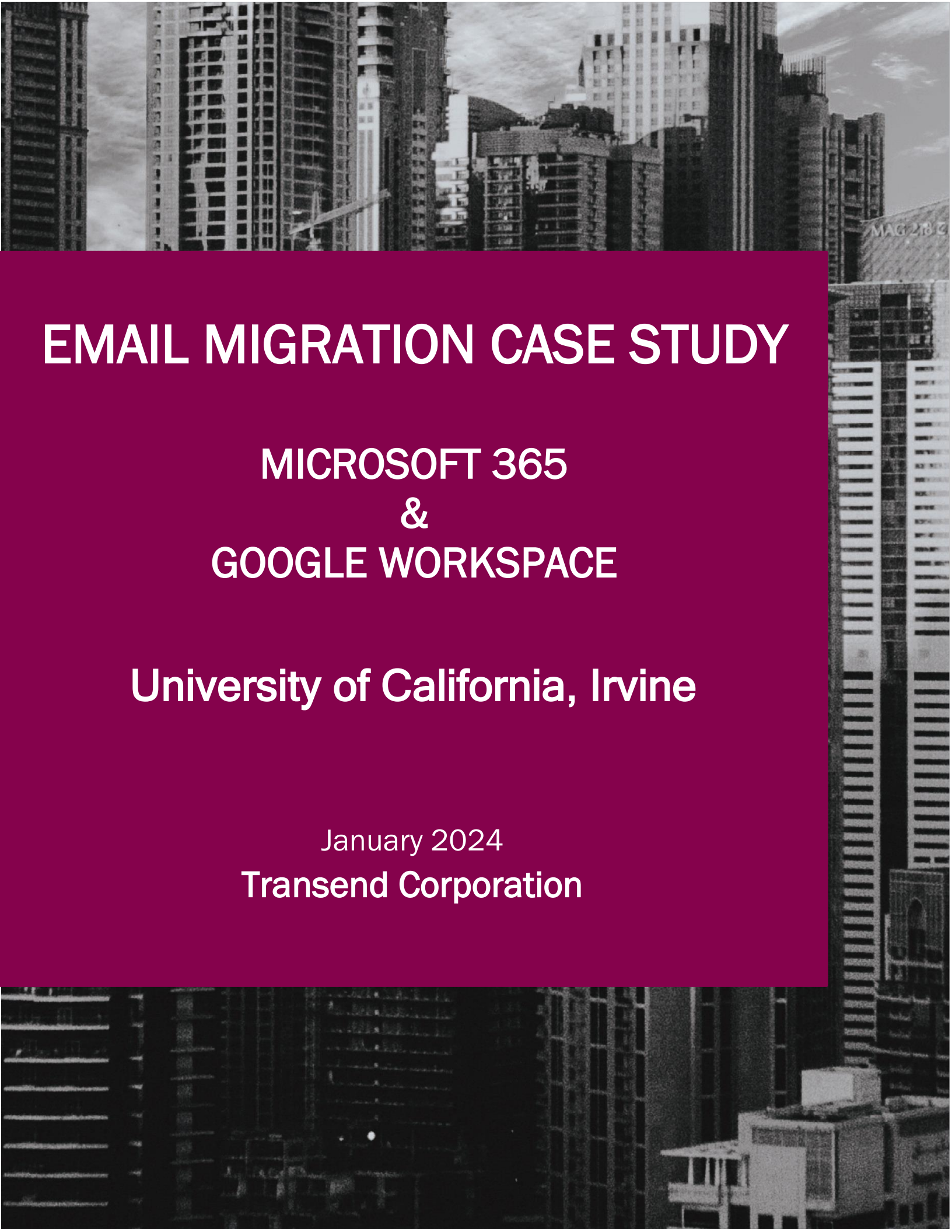

EMAIL MIGRATION CASE STUDY

MICROSOFT 365
&
GOOGLE WORKSPACE

University of California, Irvine

January 2024

Transend Corporation

Project Overview

The University of California, Irvine ("UCI"), a public land-grant university and part of the University of California system, provides email services to over 100,000 users including research teams, healthcare providers, faculty, office staff, retirees, and students. Approximately 7,500 active accounts, using 22 TB of data, were served via a legacy on-premise IMAP system known as "ES Mail." With cybersecurity as a top priority from the University of California Board of Regents, UCI funded the migration from the insecure, legacy platform to secure, feature-rich, cloud-hosted email services. The objectives were to ensure not only compliance with security policy and standards, leveraging a more feature-rich messaging experience, and minimizing the transition pain for end-users.

Each group of users has different communication and collaboration needs, so UCI provided three different target options:

(1) Google Workspace (managed by central campus IT)

(2) Microsoft 365 (managed by central campus IT)

(3) Microsoft 365 (managed by UCI's College of Health Sciences)

Because of the complex variables and considerations, thorough planning was required in advance of migrating any data. Once the project plan was architected and approved by all stakeholders, robust testing was required to ensure data fidelity met expectations, and the transition process was proven to be seamless and non-disruptive for users.

The Scope of Work included the following phases:

- Phase 1: Planning & Infrastructure
- Phase 2: Technical Pilot
- Phase 3: Functional Pilot
- Phase 4: Phased Production Migration
- Phase 5: Post-Production Support

Planning

Initial kickoff: July 1, 2022

The planning phase entailed a meticulous analysis of the source environment, communication patterns, and user base to ensure all factors were considered when architecting the *Project Plan*. The inventory of source users and objects identified inactive accounts that did not require migration, reducing the number of active accounts in migration scope to 7,500.

As a large and integrated organization, it was essential to tailor the account handling process to accommodate the diverse needs of various stakeholder groups within the university.

> *"Transend committed to help us to achieve our desired outcomes. Throughout the project they showed flexibility and collaboratively addressed the challenges we met along the way in our complex environment.*
>
> *Transend demonstrated that they were not just hired hands; they were partners in our success from day one."*
>
> – *Henry Jenkins*
> *Executive Director, Enterprise Infrastructure & Operations*

Technical Pilot

Completed: Aug 16, 2022

Transend's recommended migration methodology includes a *Technical Pilot* testing phase before Production. This phase was critical for validating credentials, confirming the data fidelity of migrated records, and collecting performance benchmarking data to guide scaling decisions. Transend Migration Console (Transend's internally developed mailbox migration software) leverages multiple workstations running concurrent

threads to work in parallel, yielding significant scalability. However, it's important to appropriately size the migration farm to ensure processing efficiency and avoid diminishing returns from overloading compute resources.

Note: The Production section of this case study details throughput optimization gains achieved based on the analysis of Technical Pilot data.

Additionally, Transend's use of its proprietary software, developed and managed in-house, affords the unique flexibility to implement both configuration changes and custom code adjustments as needed to modify migration behavior in real-time. Given UCI's three target options for its users, it was important to migrate data into test accounts for all three environments. The *Technical Pilot* was instrumental in identifying software configurations that ensured optimal outcomes for all endpoints.

Functional Pilot

Aug 16 - Nov 7, 2022

With data fidelity confirmed to meet expectations, the next step was to validate the transition process and user experience in the new environment. The *Functional Pilot* aimed to transition users' production accounts and simulate actual operations to determine required optimizations for the cutover process.

During the *Functional Pilot*, select users went "live" in the new environment, allowing for a thorough assessment of both the transition and the post-migration experience. Considerations included support issues that arose, user confusion regarding the new interface and features, intuitiveness and effectiveness of UCI's user communications, and the responsiveness of the support team. Insights gleaned from these areas informed refinement of the *Project Plan*, communication templates, and support resources.

Ultimately, the *Functional Pilot* provided essential data that allowed UCI and Transend to design a batch cutover schedule aligned with the capacity of in-house support resources.

Production

Nov 7, 2022 - July 31, 2023

The goal of the planning and testing phases is to ensure that when *Production* commences, all variables are anticipated, and both the data processing and transition experience are predictable and smooth. While challenges are inevitable, they are met with well-crafted strategies ready for implementation.

Migrating 7,500 users and 22 TB of data in 27 batches over eight months required a meticulously planned process that was predictable and free from unexpected issues or consequences.

Communication is critical

UCI's organizational structure and complex migration and communication requirements were unique—each target tenant was supported by a separate central IT team, one of which also managed the source platform. Separate central IT teams were responsible for managing user account provisioning and mail routing. Academic users (research teams, faculty, and school administration) also rely on local school IT teams for guidance and support. To maintain alignment between the Transend and UCI project teams, bi-weekly meetings were scheduled for the project's duration to facilitate coordination of tasks between relevant parties. This constant communication channel was crucial, revealing unexpected issues and variables in real-time that, if unaddressed, would have caused delays or even project failures.

The project teams also utilized a dedicated Microsoft Teams channel for secure file sharing and asynchronous conversations. A central user list, tightly managed by project leadership as the one source of truth and aggregating data from various systems, provided clarity on user allocation to specific migration batches and indicated the requisite handling for each.

UCI's internal communication was especially important during the *Production* phase. Each school and department chose their own target email platform, and in some cases, individuals opted for different target platforms than their colleagues. This information was incorporated into the central user list, enabling precise batch definition, scheduling, and monitoring. Such detailed management of user groups ensured proactive communication with users about their transitions, preparing them to access and use

their new email accounts when needed. Multiple communications to end users, starting well in advance of their cutover date and repeated as the date grew closer, were important in managing expectations.

Furthermore, UCI's Health Sciences department opted out of a legacy data migration directly into their target mailboxes; instead, they requested that Transend migrate their data into local PST files. This approach allowed Health Sciences users to access their legacy email from a local Outlook client, while their cloud-hosted mailbox contained only new or native data.

Performance tuning at scale

Because UCI's ES Mail servers were hosted internally in its on-site datacenters, the migration farm (machines that run the Transend migration software) was hosted on UCI's internal VM infrastructure. With 22 terabytes of data to migrate, it was critical to ensure a fast, low-latency connection without taxing network resources used for other purposes. Initial throughput testing during the *Technical Pilot* identified far slower migration rates than expected, yielding around 200 MB/hour for each active thread. Transend worked with UCI's engineering team to investigate network latency, host machine resource utilization (especially disk I/O), and source server performance.

We found that the migration farm was subject to rules imposed by the initial image and Windows domain policy, requiring live scanning and scheduled reboots. After an internal security analysis, UCI was able to exempt the migration farm from those rules. These changes more than doubled the throughput rates while significantly reducing system load. Robust scaling further increased overall throughput, allowing for an aggressive cutover schedule between batches.

Due to multiple endpoints, we configured separate migration farms, each with its own console machine to manage and monitor batches. One migration farm migrated data to Microsoft 365, and another to Google Workspace. Eventually, a third migration farm was used to migrate data into local PST files. Two smaller migration farms were maintained for testing and troubleshooting purposes. The final configuration included just under 100 VMs dedicated to the project. Because of the data processing analysis performed during the *Technical Pilot*, we were able to run all tasks simultaneously without slowing down user access or day-to-day email performance. This concurrent data processing efficiency also minimized the time needed to complete each migration batch, providing the speed necessary for overnight cutovers.

Throughput Optimization

IMAP to Microsoft 365	
Single machine, single thread	395 MB/hr
30 machines, 11 concurrent threads/machine	127 GB/hr
IMAP to Google Workspace	
Single machine, single thread	583 MB/hr
30 machines, 11 concurrent threads/machine	188 GB/hr
IMAP to Local PST Files	
Single machine, single thread	3 GB/hr
10 machines, 11 concurrent threads/machine	352 GB/hr

Managing the User Experience

UCI's goal for managing user cutovers was to perform final (delta) migrations overnight. This was only possible because we leveraged the performance scaling findings during the *Technical Pilot* to ensure efficient cutovers. The largest mailboxes were 45 GB in size with a maximum message count of 5.16 million messages. Even at full scale, those mailboxes would require more than one night to migrate in a single pass, so we employed a Staged migration process. Email belonging to the entire user base was migrated during Stage-1, prior to cutover. After updating the email delivery point for users in a batch to their new mailbox, Transend performed a Stage-2 migration, which only migrated email sent or received within a few weeks. Date filters and deduplication functionality ensured that only new records were migrated, avoiding any duplication.

We implemented a communication plan that included email and web-based messaging for users and department heads. Cutovers were scheduled and announced well in advance and were carried out according to the plan.

Post-Migration Support

Support period ended Sept 19, 2023

Given the limited number of UCI's support staff relative to the full user base, post-migration support presented a significant challenge. During the *Functional Pilot*, Transend was tasked with helping UCI support users after the cutover by providing L1 ***Managed Help Desk*** services. The pilot served as a trial to ensure user transitions were smooth and immediate support was available for any access or usage issues with the new system, facilitated by an on-demand, knowledgeable engineer. Transend's dedicated Managed Help Desk staff worked in concert with UCI's support team to promptly address incoming queries and expedite the escalation of issues requiring L2 engineer intervention.

The *Functional Pilot* revealed that users found the pre-transition communication clear and easy to follow, resulting in a lighter support burden than anticipated. Consequently, UCI decided to manage user support during the *Production* phase with an internal post-migration support team. Transend continued to provide L2 and L3 support, while UCI effectively managed frontline L1 inquiries.

Project Results

From the initial kickoff meeting to project completion, Transend collaborated with UCI over the course of a 12 month period. The project demanded meticulous planning and setup, comprehensive pilot testing, and over a hundred project meetings to achieve a phased production migration that was thoroughly predictable. The adoption of targeted migration batches meant that each group of users, spread across 27 separate batches, experienced a transition tailored to their needs, resulting in negligible downtime and minimal interruption to their daily operations.

Upon completion, UCI had successfully transitioned from its legacy IMAP ES Mail platform to the more feature-rich Microsoft 365 and Google Workspace solutions without disrupting users.

Transend effectively migrated 7,500 users and all 22 terabytes of data on time. The project didn't just meet customer expectations; it surpassed them, delivering an exemplary model of user-centric IT change management.