Dual Run—Replatforming solution

White Paper

Date: July 13, 2023
Authors: Avudai Gomathinayagam, Cat Perry, Rajesh Ramachandran

The intention of this document is to provide high level information about Google's Mainframe Modernization replatforming solution—Dual Run. This document is intended to answer frequently asked questions around our replatforming solution, what it entails, and how we engage with customers to meet their objectives.

Table of Contents

Mainframe modernization challenges

Google understands that undertaking a mainframe modernization project is no easy feat. These long and arduous projects are historically considered challenging and complex. Below are several common considerations that are taken into account when going through this journey,

- Time: Traditional migrations of mainframe workloads take a long time to complete
- Migration risks: Customers looking to migrate their highly-regulated workloads often feel they can never be 100% certain they have tested for every instance, leaving some level of assumed risk in the migration process
- High costs: Since the migrations take a long time due to extensive time spent on manual testing, these migrations require heavy investment and become cost prohibitive

Google is addressing these challenges with **Dual Run**, a replatforming solution that is **exclusively available only on Google Cloud**.

What is Dual Run?

For background, this technology—originally developed by Banco Santander—was used to successfully migrate part of their UK workload off of the mainframe. Banco Santander now uses it to migrate their core investment banking application in Spain from the mainframe to Google Cloud with an expected completion date by Fall 2023.

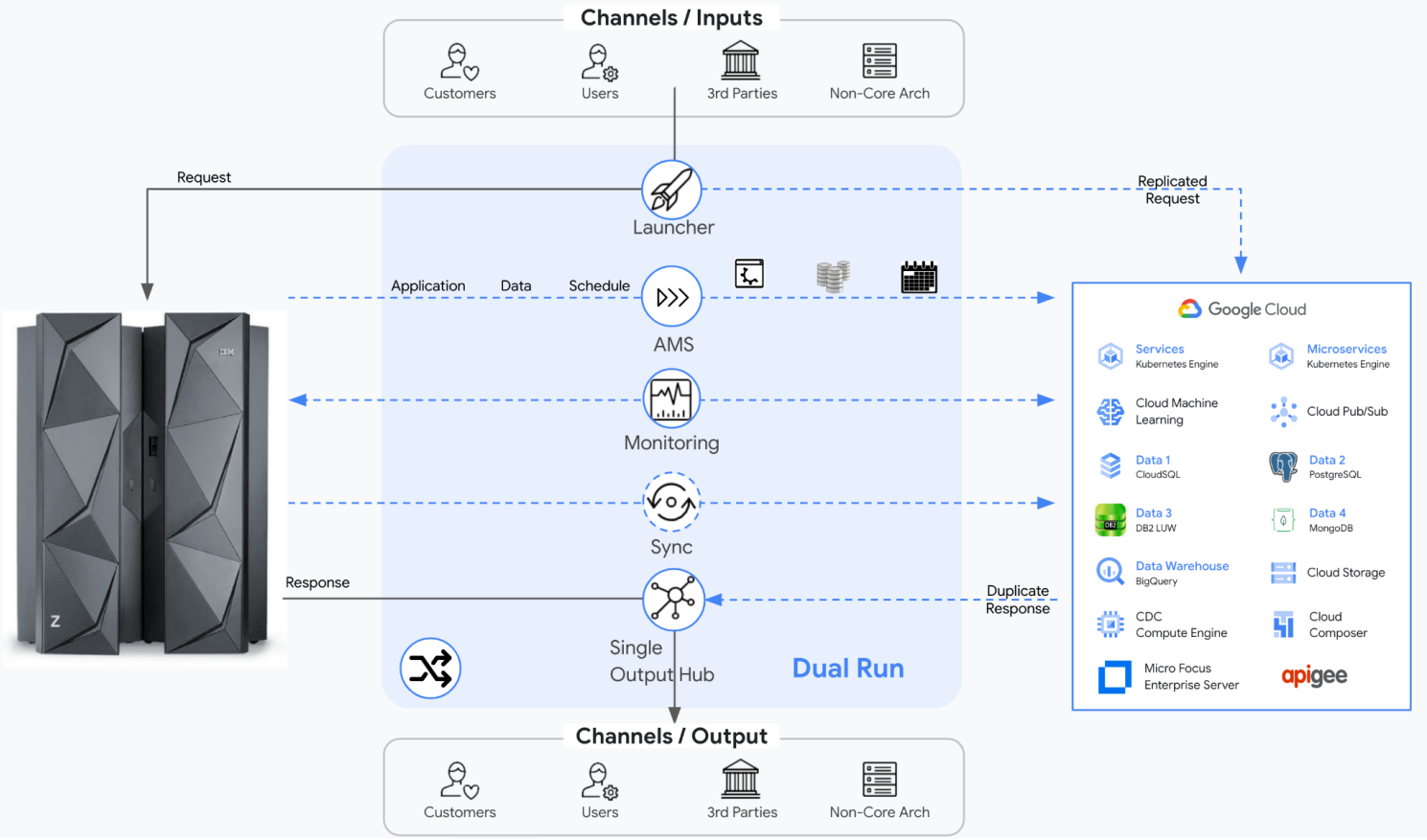
Google Cloud now offers Dual Run to replatform applications from the mainframe to our platform. Through a set of components and automation, Dual Run allows the mainframe and Google Cloud to run in parallel while validating that performance and functional outcomes are equivalent. This mitigates migration risks and reduces business testing time significantly.

Included in the set of components are the following;

- **Assessment & Migration Suite (AMS)** offers two modes to streamline migration. In discovery mode, AMS does a syntactical scan of the application

code and reports compatibility issues in the mainframe code base. In migration mode, AMS scans and converts the application code to a compatible syntax for the Micro Focus environment, and converts the database schema (DDLs) to a compatible syntax for the target database (DB2 LUW). AMS also includes an option to migrate the schedule from Control-M on z/OS to the distributed Control-M

- **Launchers** replicate mainframe transaction requests to Google Cloud, capture and log the responses, and send them to the comparator module
- **Monitoring** compares the outcomes of online and batch processes executed in the mainframe and Google Cloud, and feeds the results to the dashboards
- **Synchronizer** performs a database and file sync between the mainframe and Google Cloud to bring the cloud instance in sync with the mainframe state
- **Single Output Hub** prevents parallel running secondary instances from sending duplicate responses to end users, third parties, and dependent systems by blocking the response from the secondary system



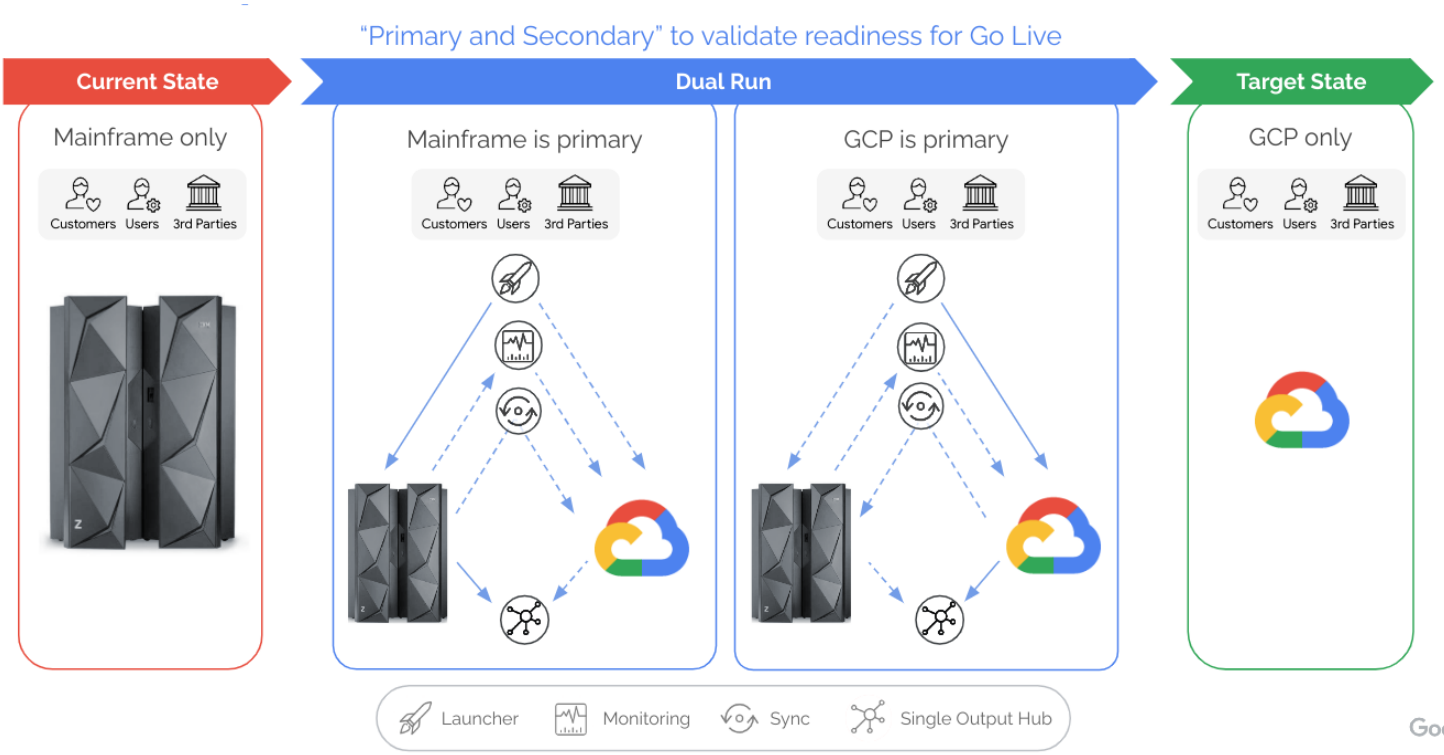
Phased approach: Primary and secondary

The chart below demonstrates the migration journey with Dual Run in phases.

Phase 1 sets up the infrastructure for the Dual Run environment and synchronizes the data to Google Cloud. The automated components mentioned above will compile the code and synchronize the data from the mainframe to Micro Focus on Google Cloud.

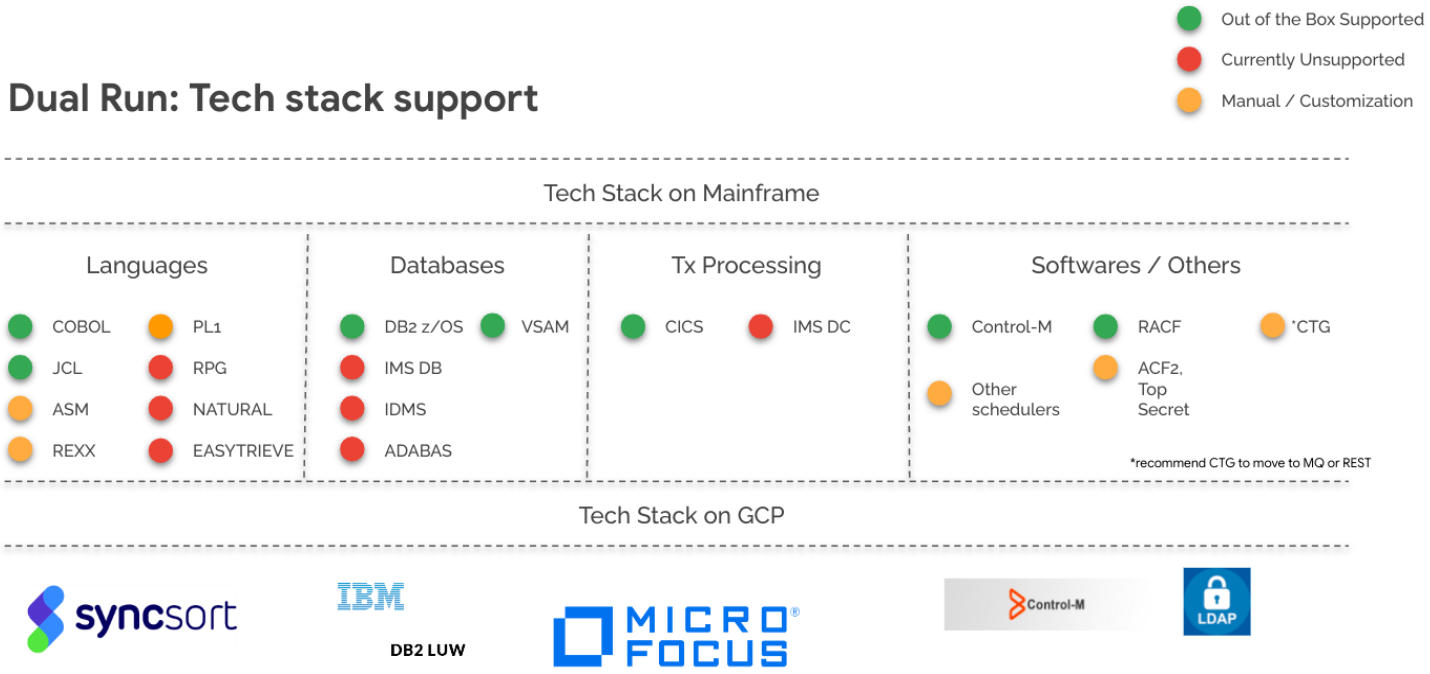
Phase 2 enables Dual Run with the mainframe as the primary system and Micro Focus on Google Cloud as the secondary system. Dual Run components replicate incoming requests and transactions to the mainframe and Google Cloud environment without any impact to the users. The components then compare responses and send comparison details to dashboards that provide functional and technical metrics and KPIs for further analysis and decision making. They also compare batch output files using the framework and push details to the dashboard. Phase 2 typically runs for 6 months to 1 year, depending on validation needs and acceptable risk levels

In Phase 3, customers get the choice to completely switch off the traffic to the mainframe or make it secondary while Google Cloud becomes primary.



Dual Run support stack for z/OS

The image below details the current supported technical stack. The eligibility criteria may be subject to change in the future as we progress through the product roadmap and continue to build the solution with Google product engineering. Green entries are fully supported out of the box, orange are manual or customizable efforts that we will evaluate, and red is what is currently unsupported.



Google's approach

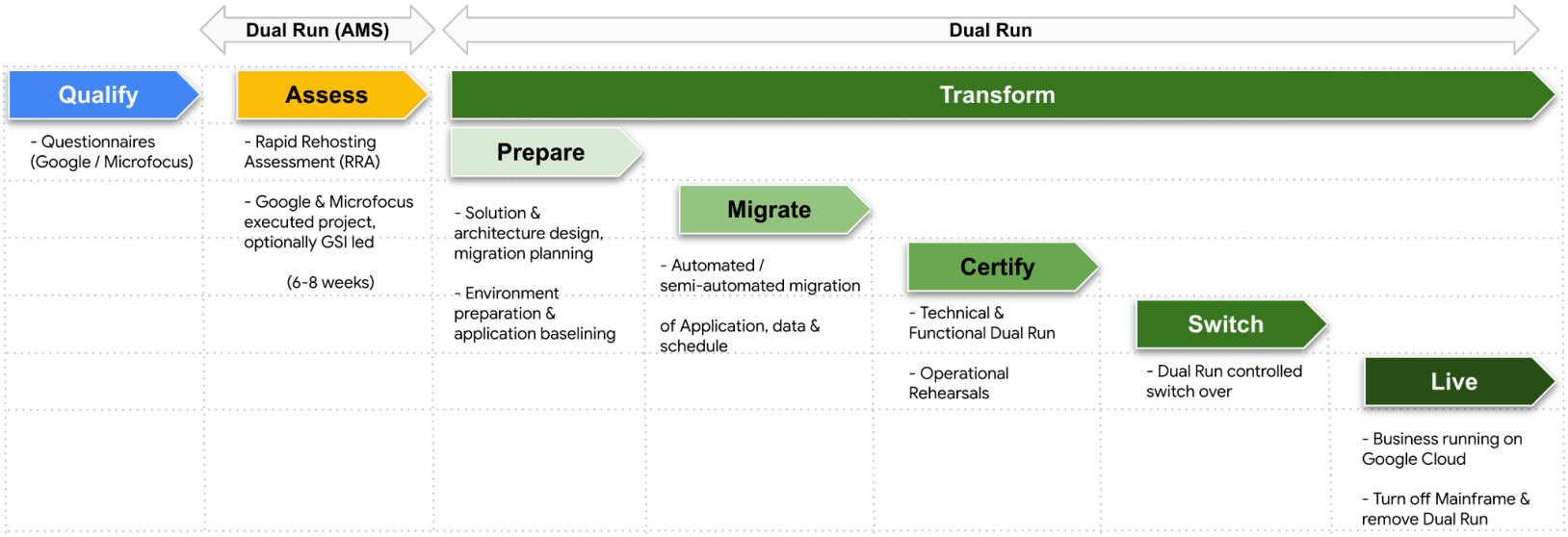
Google starts the modernization journey with a Qualify phase, where we evaluate the customer's responses to our questionnaire to determine the value in moving forward with a rehosting assessment.

In the Assess phase, we conduct an evaluation aimed at understanding the mainframe application landscape and the applications' technical compatibility with Dual Run.

Based on the assessment outcomes, we would then need to involve a Global System Integrator (GSI) for a Transformation proposal. The GSI will plan, size, and estimate the

overall transformation project while Google supports sizing and estimates the Google Cloud infrastructure.

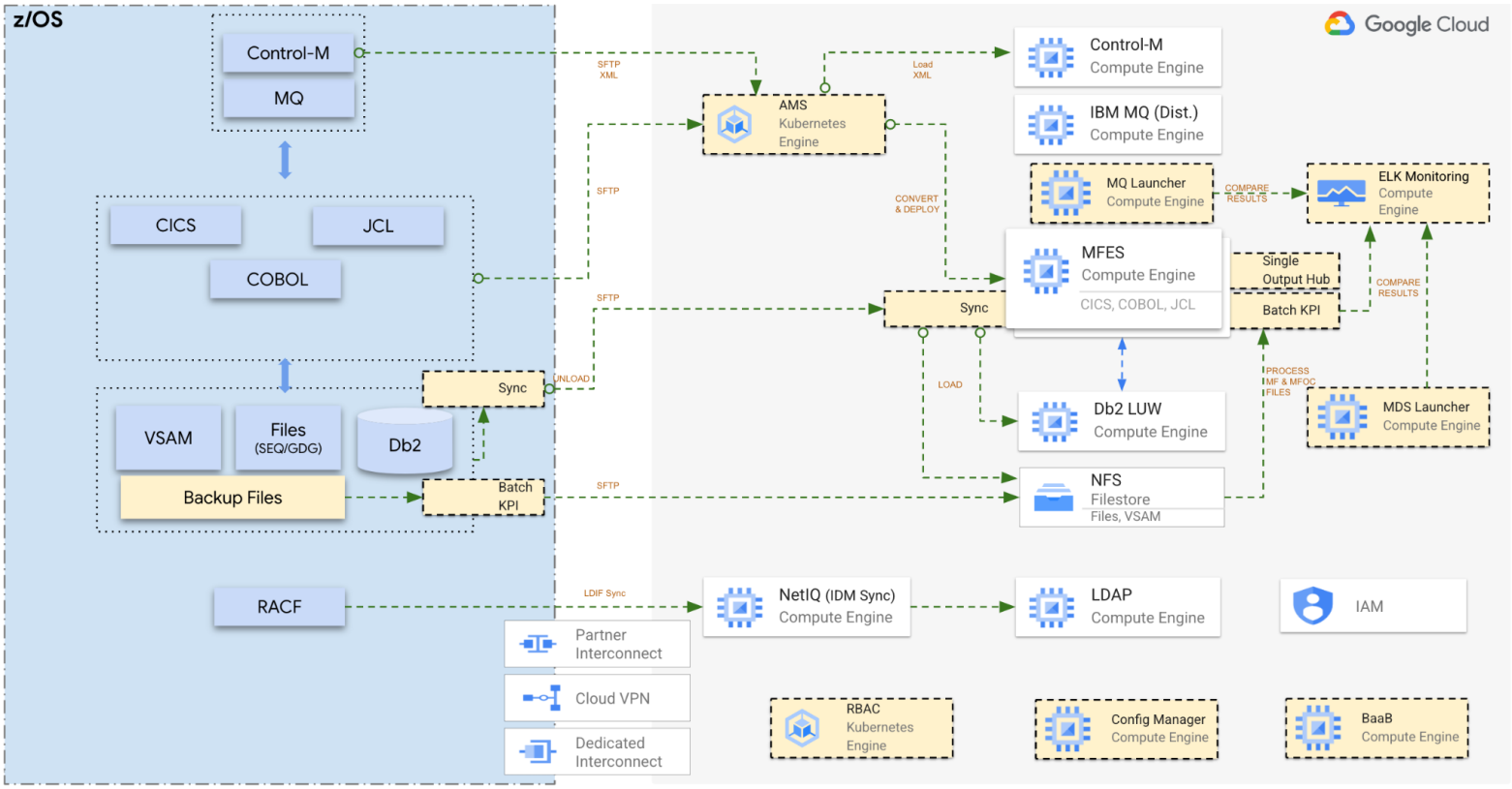
The Prepare stage—in addition to typical rehosting project activities—includes some Dual Run-specific setup activities, while the AMS modules' migration engines facilitate Migrate activities. In the Certify and Switch stages, the production environments run in parallel. When they pass outcome validation, primary switches to Google Cloud while the mainframe continues as a backup secondary system.



Reference architecture: Dual Run state

The reference architecture below shows the basic Google Cloud resources and key Dual Run components deployed for a sandbox parallel workload setup. The Dual Run components are highlighted in yellow, while the application-specific infrastructure components are shown in white for Google Cloud or blue for the mainframe. The majority of Dual Run components will be deployed in the target Google Cloud environment, with very few components running on the mainframe to minimize the number of changes needed for the existing mainframe setup.

In a production setup, the highlighted Dual Run components will be deployed and used only during the transformation phase to enable workload migration, parallel run, certification, reporting, and switch-over. These Dual Run-specific components are then removed at the end of migration.



Thank you

For questions, examples, references:
Please contact mainframe@google.com
Google Cloud Consulting