

## Modernizing key data repository with Dell technology



Dell Digital, Dell's IT organization, modernized a business-critical data repository in-flight on Dell EMC PowerMax.

### Business needs

One of Dell's largest transactional databases was out of space. The Asset & Entitlements Service Data Repository, which is leveraged by some 120 systems companywide, lacked the scalability to keep pace with increasing demand. Key to more than a billion transactions a week, the repository's data abstraction application also needed modernizing.

### Business results

- Faster, more flexible, scalable and secure database access
- Faster, more efficient backup and recovery
- Enables developers to upgrade features more quickly to meet users' changing needs
- eSupport portal users experienced up to 38 percent faster response times\*
- Field technician parts replacement mobile tool delivered up to 72 percent faster response times\*



“The team achieved phenomenal results of business integration logic and service data repository ecosystem resiliency, faster recovery and high availability through leveraging world-class Dell products and excellent engineering focus.”

**Sukant Patro**

Senior Director, Dell Digital

### Solutions at a glance

- Deployed Dell EMC PowerMax NVMe (non-volatile memory express) storage
- Upgraded Dell PowerEdge servers to the latest generation
- Used Dell EMC PowerProtect DataDomain for backup and recovery
- Deployed new app microservices on VMware Tanzu Application Services

## Modernizing a key data repository in flight: Dell architecture, modern apps, no down time

Two years ago, the Dell Digital Assets and Entitlements (A&E) team tackled the challenge of addressing the fact that one of the largest transactional databases at Dell—the Service Data Repository (SDR)—was running out of space. It also lacked the scalability to keep pace with increasing demand.

SDR is leveraged by approximately 120 systems across Dell, handling more than a billion transactions a week. It contains records of the products that Dell sells that are serviceable—assets like laptops, servers and storage—and entitlements—the services defined by the warranties attached to those assets.

“With dwindling storage space and steadily growing transactions, the team decided it would totally overhaul SDR,” says Eduardo Mathias, IT Director for Dell Digital.

After holding workshops with stakeholders and database, network, and storage engineers to discuss architecture options, the team chose a mix of Dell technologies: Dell EMC PowerMax NVMe (non-volatile memory express) storage, upgrading PowerEdge servers to the latest generation and using Dell EMC PowerProtect DataDomain for backup and recovery.

The result is the successful migration of 120 billion SDR records and 60 terabytes of data to a brand-new server, storage and backup infrastructure with up to four petabytes of storage capacity, as well as faster, more reliable and highly scalable capabilities to better serve its wide range of users.

## Converging data

The SDR transformation began in the wake of Dell’s acquisition of EMC Corp. In 2019, Dell converged EMC’s Oracle A&E database into its SDR system, which used EqualLogic storage and Dell PowerEdge servers, and was managed by a Business Integration Logic (BIL) application.

The demand for SDR data has grown steadily since then, buoyed in part by an increase in connected devices that dial home to Dell with information from the field. Overall, SDR storage consumption has climbed by 300 percent per month in that timeframe.

Many of Dell’s services transactions begin with retrieving customer asset data from SDR to answer a question, respond to a problem or explore upgrades. Besides Services, users include Sales, Manufacturing, Supply Chain and Order Management. Dell customers also access SDR externally via APIs to view their own warranties or upgrades.

One reason the team chose PowerMax as the centerpiece to the transformation was that it saw how well it performed as the storage component of the legacy SDR, Eduardo says, adding, “We needed the best system that money can buy.”

Not only did the A&E team need to define the architecture to upgrade the database, it also had to find a way to do so without disrupting users across Dell in their crucial day-to-day functions, he notes.

After forging a strategy with stakeholder input, the A&E team began to execute the plan in April 2020. The two biggest challenges the project faced were migrating the data over while making sure nothing got lost and making the transition without impacting the applications that were consuming the data.

The team met those requirements by duplicating and syncing the data in read-only mode before finalizing the migration. That meant spinning up the new infrastructure, making a copy of the data, and synchronizing the data between the old and the new repositories. Every time something was written in the old system, the data got replicated into new.

Beyond strategizing to meet migration challenges, the team conducted extensive testing to make sure the new SDR was resilient, reliable and would produce the required performance for this high-demand database. “The results were astounding,” says Manjunath Reddy, Consultant, IT Architecture. “We noticed significant improvement in performance and impressive results. We tested multiple tables and couldn’t believe an almost 3000% improvement in response time for a 2.8 billion contracts table.\*\*”

In mid-July, the team moved the read-only services, which is the main format that 76 percent of services consume. A week later, the team completed the switch by having the system stop writing data to the old infrastructure and start writing it to the new infrastructure.

The transition was made with no interruption to SDR users.

## Moving the application tier to the cloud

In order to achieve more scalability and flexibility, the A&E team needed to modernize the Business Integration Logic (BIL) application that abstracts data from the SDR for the more than 1000 services linked to the database. BIL was a traditional monolithic app that pulled data from and wrote data to the repository running on a third-party vendor product installed in A&E's servers in the data center that hosted and ran Java applications.

Parallel to re-architecting SDR, A&E teams worked to break down the BIL application into microservices, smaller blocks of code centered around individual services.

More than a dozen small balanced teams are in the process of working with SDR app consumers to rewrite these smaller apps with cloud-native patterns in mind, using Spring Boot, an app development framework. The teams are using an iterative, test-driven development methodology to ensure the customer-centric results that are part of the company's Dell Digital Way approach.

The apps are then deployed in VMware Tanzu Application Service, a modern application platform that runs and manages custom apps.

Moving to a microservices architecture can increase business agility by decoupling the apps from the underlying architecture they run on. It also enables developer self-service for resource provisioning and the ability to upgrade features more quickly to meet users changing needs.

"For example, adding more instances of an A&E service to meet growing demands used to take six months. Now with a modern platform, it takes six seconds. I go there and click. Instead of 10, I want 20. Okay, confirm, done. I have 20 now," Eduardo says.

Deploying microservices on VMware Tanzu also simplified high availability patterns and automated complex infrastructure management for both public cloud and on-premises workloads.

"The team achieved phenomenal results of BIL/SDR ecosystem resiliency, faster recovery and high availability through leveraging

world-class Dell products and excellent engineering focus," says Sukant Patro, Senior Director, Dell Digital.



"We needed the best system that money can buy."

**Eduardo Mathias**

IT Director, Dell Digital

## Faster, safer, more scalable

The re-architected SDR and cloud-enabled applications have resulted in faster, more flexible, more scalable and more secure A&E capabilities. For example, users that interacted with A&E's customer-facing, self-service eSupport portal - which supplies product warranty and support details - experience up to 38 percent faster response times. The mobile tool used by our field technicians to manage parts replacement delivered up to 72 percent faster response times.\*

For backup and recovery of this essential database, A&E is finalizing software that will enable the completion of the process to replace PowerVault backup technology with Dell EMC's PowerProtect DataDomain. DataDomain is anticipated to speed up the data backup process from days to hours.

"The successful re-architecture and upgrade of the Service Data Repository was no small feat, and we had a stellar team working on one of the largest database migrations ever," said Mariely Franzetti, Vice President, Dell Digital. "I am so proud of the innovative customer-centric capabilities that were delivered."

*\*Based on internal analysis, July 2020*

*\*\*Based on Dell testing, May 2020*

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