

Cloud Migration and Operations Support for ERP Environment at US Based Manufacturing Firm within Aviation Industry



Overview

In adhering to the AWS well-architected framework and ensuring a highly available architecture, our approach involved deploying the application across two distinct availability zones, deploying Pacemaker to manage ERP ASCS and ERS services. Leveraging CloudFormation templates for infrastructure setup and ERP application installations, our solution exhibited robustness in managing maintenance tasks with minimal downtime. Furthermore, we implemented Cloud-Endure for application-level disaster recovery and Oracle Data Guard for database-level resilience, successfully meeting customer demands for a 15-minute RPO and a 2-hour RTO.

Customers require a transformation of their IT infrastructure to tackle the high total cost of ownership (TCO). They seek to migrate servers and applications to AWS for improved efficiency, agility, resiliency, and cost optimization. Enhancing the resiliency of ERP systems with high availability and disaster recovery is crucial, along with reducing reactive maintenance, boosting productivity, enhancing security, and achieving greater visibility and accuracy of assets. Ultimately, they aim to attain an environment with improved stability and operational excellence.

Client Background and Challenge

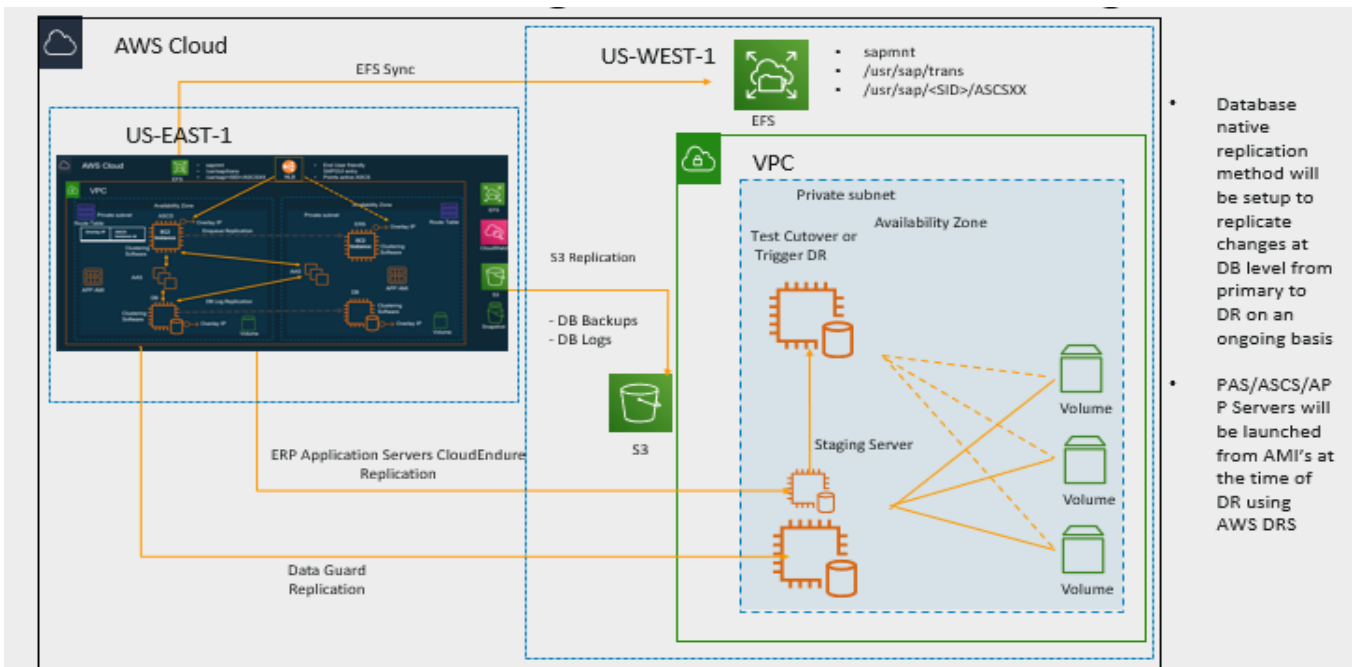
A US based manufacturing firm within aviation industry stands at the forefront of aerospace technology, renowned for their cutting-edge jet and turboprop engines, plus comprehensive integrated systems. They cater to various aviation sectors, spanning commercial, military, business, and general aviation. Their global service network ensures unwavering support for these top-tier offerings. Our customer faces major challenges, including the ones listed below.

- ▶ High turnaround and less agility with the existing datacenter provider (high turnaround time for request processing for metrics submission and DB refresh activities).
- ▶ Infrastructure scaling.
- ▶ Complete outage for monthly OS patching.
- ▶ Effective approach for data refresh tasks to reduce issues.
- ▶ Infrastructure scaling.
- ▶ Improvement in HA and DR strategy.
- ▶ Reduce downtime for monthly OS patching.

Our Approach and Solution

- ▶ Run assessment of pre-existing ERP environment to understand system landscapes and customer's business and operational requirements.
- ▶ A subset of systems based on system type and migration methods were migrated (ECC 6.0 are lift and shift) whereas the rest of systems were built as new system followed by restore from the existing system.
- ▶ Hyper care plan post go-live for the services in scope.
- ▶ Migration of aerospace and defense ERP instances and the associated systems from current provider (Virtustream Dell Cloud) to AWS.
- ▶ Tech Mahindra to bring their expertise to execute complex ERP migration best practices on cloud. A customer's large data in files should be migrated to cloud as well.
- ▶ Created a business case and assessment leveraging AWS Migration Evaluator Service
- ▶ Designed and planned workloads migration from Virtustream Dell Cloud to AWS cloud
- ▶ Created landing zone for ERP workloads.
- ▶ Defined network outlay with route tables, subnets CIDR range planning and VPC transit gateways
- ▶ CloudFormation stacks were used to Build EC2, EFS and network load balancer to align with IAAS strategy.
- ▶ Customized images of RHEL and OEL images used to build instances using AMI
- ▶ Optimized storage solutions - EBS, EFS and S3
- ▶ AWS NLB network load balancers configured to connect ERP GUI logins
- ▶ NACLs and security Groups implemented to secure ERP apps and DB
- ▶ Pacemaker solution is used for ERP ASCS and ERS central instance for high availability
- ▶ Oracle DG broker is used for DB high availability and DR solution
- ▶ AWS DRS/Cloud Endure used for ERP CI and ECC application instances in DR scenario
- ▶ ERP data mock loads and performance testing done to check system stability
- ▶ AWS instances bootstrapping with Chef for configuration management
- ▶ Fully automated monthly patching of operating systems using AWS SSM
- ▶ Qualys, Splunk, CrowdStrike installed for security, logs, and endpoint protection
- ▶ Cloud Watch and New Relic is used to monitor AWS resources
- ▶ AWS backup policies created for volumes snapshots and DB RMAN backups
- ▶ S3 buckets are used for data migration and route 53 is used for site resolutions
- ▶ OSN has been enabled for Oracle database backups

AWS Architecture



Architecture meets the customer requirements of high availability and disaster recover solution

- ▶ Primary region with two AZs were built in US-EAST-1 and DR is in US-WEST-1
- ▶ CloudFormation templates were used to auto provision AWS Infra with ERP installation
- ▶ Pacemaker with overlay IP across different AZs has been configured as HA solution for ERP systems.
- ▶ AWS disaster recovery solution (DRS)/Cloud Endure which performs Storage replication has been configured for disaster recovery solution. This solution is able to meet the RPO of 15min and RTO of 2hrs as required by the customer while keeping the cost minimal.
- ▶ Oracle data guard has been used at database level for HA and DR. For HA the replication mode is synchronous and for DR asynchronous replication has been used.
- ▶ Oracle OSB was used for DB backups which sends the DB backups directly from Oracle to S3. This backup is replicated to the DR region using the S3 Cross Region Replication (CRR).
- ▶ Shared EFS mounts were configured per SID. EFS sync is being used to replicate data across Region for DR.

Business and Community Impact



Reduced the TCO for the customer while improving the RPO and RTO objective by migrating from Virtustream Dell cloud to AWS cloud. The migration was performed in much shorter time and hence reduced downtime and cost to the customer.



Automated OS patch process using AWS SSM.



Aligned customer practice to DevOps by leveraging AWS CloudFormation stacks for provisioning and scale the workloads.



Integrated with ServiceNow for incident management enabling faster business turnaround for critical issues



Operational efficiency increased with the automation of alerts, backup process and nimble business recovery/restore process in case of disaster.



Increased system availability with patching maintenance windows for each environment as per the customer standards



Achieved near zero downtime for monthly operational maintenance activities.



Increased the security positioning of the customer ERP workload by segregating their workload and following the industry standards on securing ERP.



Increased operational resilience by implementing New Relic monitoring tool.



Increased the availability of workloads with clustering for HA and Cloud Endure (AWS DRS) for DR.



Continuous optimization of AWS resources as part of operations excellence.



Chef is used for configuration management to maintain the infra and application related agents update to date. This has helped in improving risk management, streamlining IT operations and Increasing Service resiliency.

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