
# Mitra Keluarga

Successful migration of SAP and Non-SAP systems to AWS Cloud in record time

## Executive summary

Mitra Keluarga embarked on a digital transformation journey with T-Systems due to scalability limitations, skillset, quality, and frequent downtime issues with their on-premise data center operated by a local service provider. The project scope included full proof of secured network design, proof of concept migration based on production system, and actual production migration of business-critical applications (SAP® and non-SAP systems). With a new cloud platform, Mitra Keluarga will be able to continue its digital transformation journey. The project was completed in a record timeline of three months (February to April), which also shows that, during the global coronavirus pandemic, life goes on and IT has no borders. Colleagues from Indonesia, Singapore, India, Hungary, and Germany worked together to make this success story happen. After project completion the comprehensive landscape including development systems, QA, pre-production and production systems are on AWS.

## The challenge

- Ambitious timeline of three months
- 100 percent of work carried out from home-based offices due to the coronavirus pandemic
- Time zone differences between the global teams and customer (Indonesia, Singapore, India, Hungary, Germany)
- Complex Integration testing between SAP Healthcare and ancillary systems

## Why T-Systems as a partner

T-Systems is one of the world's leading digital service providers. It is based in Europe and offers integrated solutions for business customers. The company uses a global infrastructure of data centers and networks to operate information and communication technology. As a leading end-to-end service provider for SAP® solutions, it covers the entire value-added chain of the SAP® lifecycle. And it provides everything from a single source: from secure operation of existing systems and classic IT and telecommunications services to transformation to the cloud, from needs-based infrastructure, platforms, and software to new business models and innovation projects. T-Systems is the right partner in implementing SAP® on AWS Managed Services for customers.

## About Mitra Keluarga

The Company built its first hospital back in 1989 and currently owns and operates 25 hospitals, of which 16 are located in Greater Jakarta, five in West Java, three in Surabaya, East Java, and one in Tegal, Central Java. Typically, the hospitals are equipped with emergency rooms, outpatient clinics, inpatient wards, operating rooms, intensive care units and a pharmacy, as well as laboratory and radiology facilities. The hospitals also offer specialized services including obstetrics, pediatrics, internal medicine, angioplasty, orthopedic surgery, and neurosurgery. From its humble beginnings, the company has transformed into one of Indonesia's biggest private hospital operators with an intake of more than 2.9 million patients in 2019 and, in terms of hospital bed capacity, close to 3,000 operational beds as of September 30, 2019. The company employed more than 7,000 medical professionals including doctors, laboratory staff, nurses, and therapists with more than 1,000 specialists practicing in all of its hospitals by 2018. T-Systems implemented SAP Healthcare for three hospitals and implementation is in progress for remaining hospitals, so Mitra Keluarga knew about T-Systems' SAP capabilities.

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## The proposed solution

The project scope included full proof of secured network design, proof of concept migration, and final production migration of SAP® and non-SAP® systems. In addition, T-Systems has built high-availability clusters on Amazon Web Services (AWS) using SUSE Pacemaker (both application and database level) across the AWS availability zones. SUSE Linux high-availability extension is the cluster Linux solution certified by SAP® and SUSE Pacemaker offers packages to build high-availability clusters for both SAP® application and the SAP® HANA database.

The SAP® stack contains the following systems (applications and databases) based on SUSE Linux Enterprise Server 12 Support Package 4 (SLES12SP4):

- SAP® ECC 6 EHP8 on SLES 12 SP4 with SAP® HANA 2.0 SPS04 with ASCS and SAP® HANA High Availability using Pacemaker Cluster
- SAP® Business Warehouse 7.5 on SLES 12 SP4 with SAP® HANA 2.0 SPS04
- SAP® Gateway (Fiori) 7.5 on SLES 12 SP4 with SAP® ASE 16 SP02 PL07 on ASCS HA on Pacemaker Cluster with SAP® ASE HA setup
- SAP® Process Orchestration 7.5 on SLES 12 SPS4 with SAP® ASE 16 SP02 PL04 on SCS HA on Pacemaker Cluster with SAP® ASE HA setup
- SAP® Document Management System (DMS) on SLES 12 SP4 with MaxDB 7.9
- SAP® WebDispatcher 7.77 SP 113
- SAP® Solution Manager 7.2 SPS10
- SAP® Router 7.53 Patch 610
- Adobe Document Services (ADS) as SAP® NetWeaver extension on SAP® NetWeaver 7.5 SPS12
- SAP® Content Server 7.9 on SLES 12 SP4 with MaxDB 7.9

The backup and recovery of the SAP® systems is designed to protect SAP® application servers and database servers, OS disks of all systems, and management/jump servers against data loss, and retain data for recovery in the event of any issues. This can be achieved with an operating system backup on a local file system, which is transferred to the object storage. The DB backup is handled by a T-Systems backup/restore utility called the xbr toolset. The xbr toolset takes care of creating full and incremental backups and takes care of all the redo log housekeeping. All databases have redo logs to enable point-in-time recovery of the databases.

SAP® application server data backup will be done using an AWS backup and recovery services vault. A snapshot backup will be made for all disks that will have SAP® application server binaries, other data, and log files. SAP® HANA database backups will be done using native SAP® HANA backup tools, SAP® HANA studio will be configured to perform the backups of tenant and system databases. Backup files will be stored in the local file system storage and moved to AWS blob storage for the retention.

SAP® CloudEndure has been used for the non-SAP® systems migration. This has reduced the downtime of business-critical systems because of the continuous block-level replication, which provides real-time replication and ensures sub-second recovery point objectives for all applications and databases. CloudEndure's replication process did not affect performance or the required production systems reboot. We were able to successfully migrate the following servers:

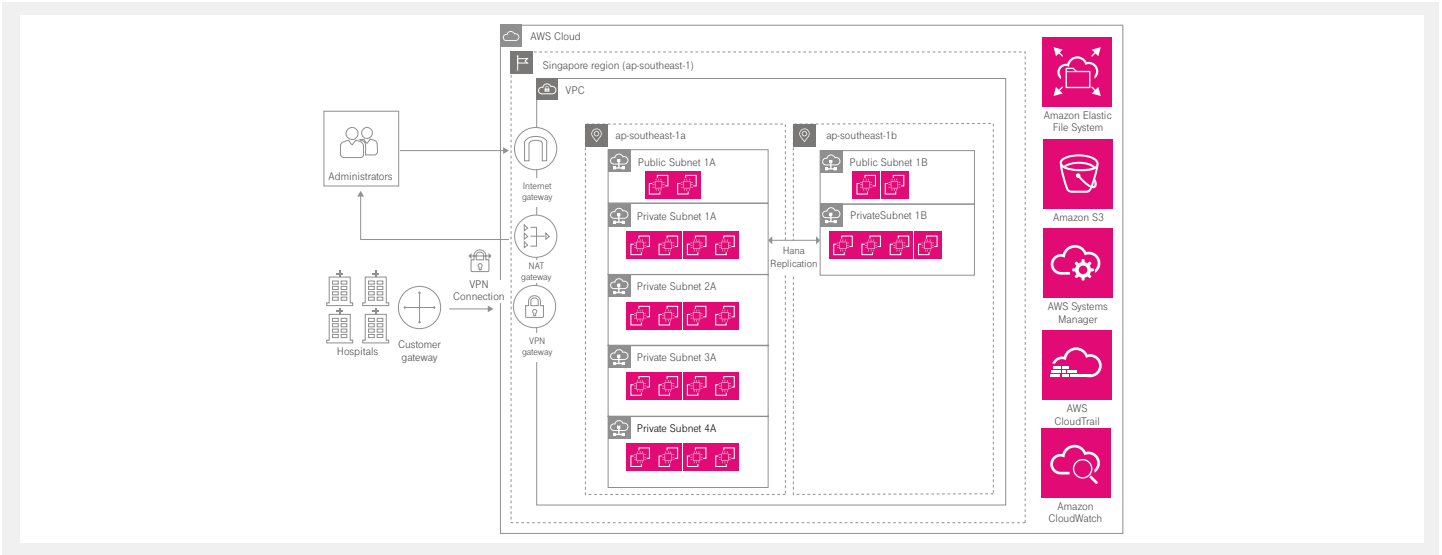
- Sysmex based on Microsoft Windows Server 2016 Standard (source and target)
- Attendance on CentOS v7.0 (source and target)
- Print Server 1 and 2 based on Microsoft Windows 2012 R2 Datacenter Edition (source and target)

The backup of the non-SAP® systems will be performed creating AMI snapshots based on the customer's requirements, stored on Amazon EFS storage for Attendance (Linux based system), and stored on Amazon Simple Storage Service (S3) in case of Sysmex with the help of scheduled jobs and AWS CLI on the server.

For this project, the following AWS services have been used:

- Amazon Elastic Compute Cloud (Amazon EC2) as basis for the SAP® and non-SAP® systems
- Amazon Elastic File Storage (EFS) as storage for backups and storage solution
- Amazon Virtual Private Cloud (VPC) to provide a logically-isolated section of the AWS cloud
- Amazon Simple Storage Service (S3) for storing backup files
- Amazon CloudWatch to create alarms and to monitor business critical EC2 instances
- Amazon CloudTrail to enable governance, compliance, operational auditing, and risk auditing of the AWS account
- Amazon Systems Manager as a central place to view and manage EC2 resources

The following architecture shows how the hospitals can access the SAP® and non-SAP® systems:

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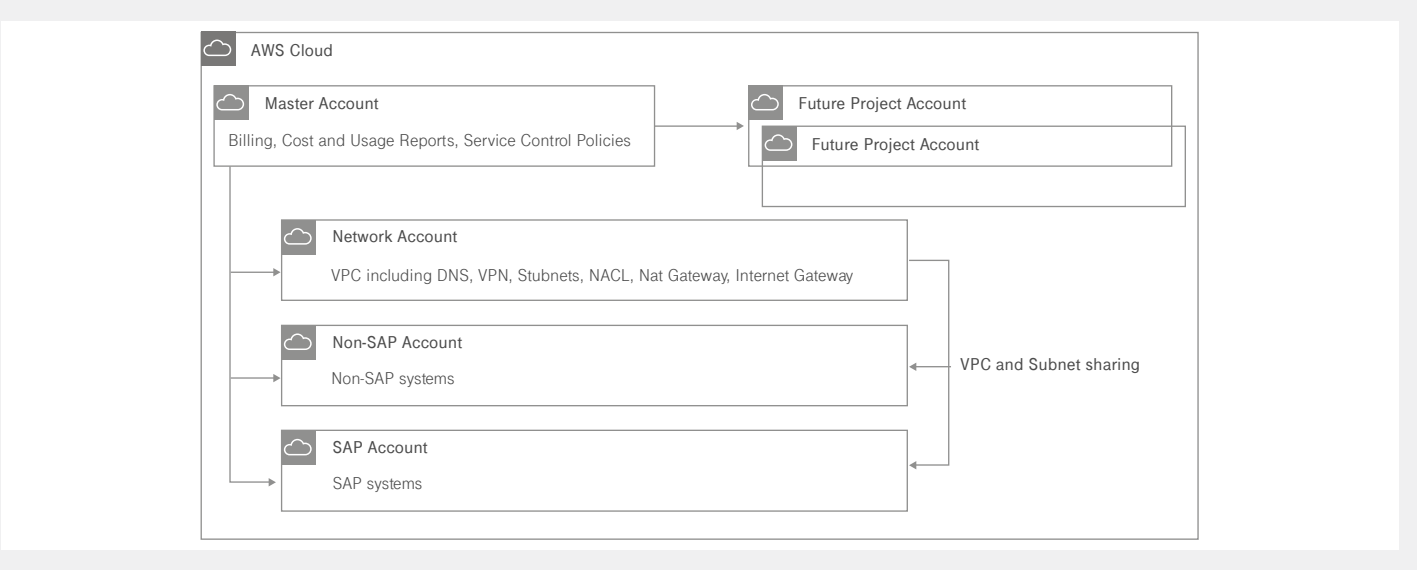
## Results and benefits

The new cloud platform is based on the Telekom Managed AWS Services. It consists of comprehensive services to support customers to optimally use the AWS cloud platform. Essential building blocks are setting up a proper account structure, secure configuration, monitoring of the key AWS services, security monitoring with notification of abnormalities, incident and change management, patch management, backup of EC2 & RDS, cost management, and cost optimization.

The following figure shows the special account structure developed for this project by following AWS best practices. This includes segregation of SAP® and non-SAP® workloads and the sharing of network specific resources like VPC, Subnets, Network Access Control Lists, NAT Gateways, etc.

Mitra Keluarga will be able to continue its digital transformation journey. With this latest migration, it will also further strengthen T-Systems' position as the trusted partner for all of Mitra Keluarga Karyasehat Tbk's needs in both system integration and digital transformation areas.




## AWS' Future plan for Indonesia

Currently, the SAP® and non-SAP® landscape is running in the nearest AWS region, Singapore. Amazon Web Services has confirmed that it will launch a new cloud region in Indonesia by the end of 2021/early 2022. Based in Greater Jakarta, the new region will be comprised of three availability zones, each a geographically-separate data center, which would be best-fit for Mitra Keluarga's business critical landscape as a healthcare provider handling health data.

## About APN partner

T-Systems is a global IT services and consulting company. The company has a global infrastructure consisting of data centers and networks. As an AWS Advanced Consulting Partner, T-Systems provides over 100 certified experts who provide strategic advice and care about the actuality and further development of the booked features, as well as full (cost) transparency. Collaboration starts with choosing the right services and tools from the AWS universe.

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