



Case Study

Network architecture for automotive OEM

In cooperation with



Executive summary

A leading global automaker and mobility provider, recently announced the development of a connected mobility platform, that will transform the in-vehicle experience for millions of their customers and advance the industry's transition to a sustainable, software-defined future.

T-Systems was brought in to develop and implement the required highly scalable networking solution to support the data retrieval and over the air (OTA) update capability across all connected vehicles.

About the customer

The leading global automaker and mobility provider offers clean, connected, affordable and safe mobility solutions. The company's strength lies in the breadth of their iconic brand portfolio, the diversity and passion of the people, and the deep roots in the communities in which they operate. The ambitious electrification and software strategies and the creation of an innovative ecosystem of strategic, game-changing partnerships are driving the transformation to a sustainable mobility tech company.

In this new era of mobility, the portfolio of brands is uniquely positioned to offer innovative and sustainable solutions to meet the evolving needs of customers, as they embrace electrification, connectivity, autonomous driving and shared ownership. Founded by visionaries who infused them with passion and competitive spirit, the automotive brands offer a full spectrum of choice from luxury, premium and mainstream passenger vehicles to pickup trucks, SUVs and commercial vehicles. These are further supported by two dedicated mobility brands, as well as financial, and parts and service brands.

The challenge

Currently, the OEM has many existing component applications for remote vehicle diagnostics, remote charging, remote software update over the air (OTA) among other IoT M2M connectivity requirements for its global automobile fleet. All of this connectivity now takes place within its on-premises network with which it connects various IoT sensors and interfaces in its platform based on AWS.

They were looking for network specialists with experience and expertise in the network security and protocols specific to IoT to assist them in setting up and maintaining a secure network for their vehicle device applications. They required a highly resilient network for their upcoming platform that can be implemented quickly avoiding project delays that were experienced in the past.

Secure network connectivity is the goal for the process of provisioning both new devices and older, existing devices that are in service, in production around the world.

It should also be noted that the network setup requires a dedicated connection to services and interfaces within the customer's on-premises network.

The networking requirements for customer platform are as follows:

- Highly available network infrastructure
- Centralized but redundant Internet breakout for the platform including traffic filtering (ingress and egress)
- Connected to on-premises data center and interfaces partners (Ipsec, DX, Internet)
- Fast turn-around cycles to add additional services



The solution

Every used network component is spanned across three availability zones within the eu-west-3 region. The solution highly focuses on AWS managed services such as AWS NAT Gateway or AWS Network Firewall to ensure easy maintenance and low TCO.

The Internet breakout was realized within a separate network account where the following components are deployed:

- AWS Internet Gateway
- AWS Transit Gateway
- AWS NAT Gateway
- AWS Network Firewall
- NGINX Proxy based on Amazon ECS and AWS Fargate

The connection to the on-premises datacenter is realized via AWS Direct Connect in a redundant way. Therefore, two lines were provisioned by T-Systems as a AWS Direct Connect delivery partner to the two datacenters of the client.

The connection is terminated within a central (DX) account and from there attached to the network account of each platform stage.

The created solution for customer is a completely IAC (infrastructure as code) deployed setup within AWS to ensure fast but documented changes to the infrastructure. All source code is located within GIT repositories and the attached CI/CD pipeline ensures a proper quality by integrated automated checks.

Since the OEM uses five stages, the pipelines are also staged so that a deployment per stage (dev,int,pre,vco,prod) is possible. This helps the customer keep the risk of untested infrastructure changes to a minimum.

Results and benefits

The implemented solution achieves all the requirements and is especially future-proof allowing to scale to millions of vehicles. It is easy to maintain and adapt due to the used IAC approach including full visibility of the used technologies.

The complete infrastructure as code (IAC) was developed by T-Systems. It can also be easily adjusted and deployed to an additional region.

The implemented centralized monitoring solution offers good visibility over the used resources as well as the cost for the used infrastructure.

Since the services used support autoscaling the platform automatically scales with increased requests and traffic and is therefore also very cost effective.

The connectivity to the on-premises datacenter is also realized by T-Systems as an AWS Direct Connect delivery partner. The connection is established from two different access points close to the respective datacenters and is configured via BGP in a redundant way.

About the partner

With a footprint in more than 20 countries, T-Systems is one of the world's leading vendor-independent providers of digital services headquartered in Europe. The Deutsche Telekom subsidiary offers one-stop shopping: from secure operation of legacy systems and classical ICT services, transition services to cloud solutions as well as new business models and innovation projects in the Internet of Things (IoT). T-Systems is also an accredited AWS Managed Service Provider (MSP) and Premier Consulting Partner with more than 500 experts on AWS with a growing list of competencies that include cloud migration, SAP system integration and consultancy support with the AWS Well-Architected Framework.

Moreover, T-Systems is an official AWS Direct Connect delivery partner, which means it is in the position to handle hosted-connections.

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