CASE STUDY:

Strengthening Disaster Recovery Capabilities with AWS

SPARKLE
THE WORLD'S COMMUNICATION PLATFORM

ABOUT THE CUSTOMER

Sparkle has successfully completed a major project by implementing Multicloud & Cloud Connect Solutions for a key customer: a leading Turkish manufacturer specializing in high-quality automotive textiles and technical fabrics. The company supplies major automotive brands with innovative and reliable products that meet stringent industry standards.

With a strong focus on quality, sustainability and technological advancement, the company continuously invests in modernizing its operations to remain competitive in the dynamic automotive sector.

Ensuring the continuity of critical business processes and data security is paramount for the customer, driving the need for a robust disaster recovery solution.

CUSTOMER CHALLENGE

Customer's operations heavily rely on IT systems to manage production, logistics, and customer interactions.

Any disruption to these systems could result in significant downtime, impacting production, schedules, and customer satisfaction.

The company required a disaster recovery solution that would provide reliable and near-instant failover capabilities, minimize data loss, and ensure the rapid restoration of operations in the event of a system failure or disaster.

The customer expressed very stringent requirements in terms of RTO (Recovery Time Objective) and RPO (Recovery Point Objective), service availability, latency, jitter, and packet loss.

SPARKLE SOLUTION

To overcome these challenges, Sparkle designed Multicloud & Cloud Connect Solutions consisting of:

1. **AWS Disaster Recovery Service (DRS)**, employed to replicate Customer's critical servers and data to the AWS cloud, providing a reliable backup and failover mechanism to ensure business continuity.

   The AWS DRS was configured to replicate a total of nine source servers each month from customer's infrastructure. These servers included 31 disks, with a total storage capacity of 5,141 GB across all disks and servers. Approximately 50% of the disks were 125 GB or larger, reflecting a diverse range of storage requirements.

   The average daily change rate on the disks was 20%, highlighting the dynamic nature of customer's data environment. To manage these changes effectively, AWS DRS continuously replicated data modifications, ensuring that the most up-to-date state of the servers was always available in the AWS cloud. A retention period of 30 days was selected for EBS snapshots, balancing storage costs with the need to maintain a robust backup history.

2. **Four (4) Direct Connect links,** complemented by **Sparkle Cloud Connect service**, extending from customer DCs to AWS - EU Central (Frankfurt), providing high bandwidth and low latency for data replication. These links were configured with Jumbo Frames to support larger packet sizes, enhancing the efficiency of data transfer. The use of Direct Connect ensured a dedicated, reliable, and secure connection, crucial for maintaining the performance and availability of the Disaster Recovery solution.

3. **Site-to-Site VPN connections** were established from each DC to AWS Cloud Region as a backup connectivity option.

4. To ensure seamless disaster recovery operations, thus minimizing downtime and ensuring business continuity, **Amazon Route 53** was configured with a failover routing policy: in the event of a failure in the primary region (AWS - EU Central (Frankfurt)), traffic is automatically redirected to the disaster recovery region AWS - EU West (Ireland).

5. **Advanced network configurations and optimizations**. The customer faced complex routing challenges that pushed the limits of native AWS services: these challenges required advanced network configurations and optimizations to ensure seamless data flow and connectivity across the infrastructure.

6. **AWS CloudWatch** integrated with Kibana. To meet the stringent RPO/RTO requirements, these services were utilized to monitor network performance and set up alerts, to ensure that any issues were promptly addressed.

7. **Terraform**. It enabled the automated provisioning and management of network resources, through network configurations as code, ensuring consistency, repeatability, and scalability. By using Infrastructure as Code (IaC), Sparkle could quickly deploy and update network infrastructure, reducing the risk of human error and speeding up the deployment process. This approach also facilitated version control and collaboration among teams, ensuring that network configurations were always up-to-date and aligned with best practices.

   Here after a piece of code for evidence:

```
# Definition of variables
variable "dx_connection_id" {
  description = "Direct Connect connection ID "
}
variable "vpc_id" {
  description = "VPC ID"
}
variable "vpc_cidr" {
```

```
  description = "VPC CIDR”
}
variable "onprem_cidr" {
  description = "On-premises network CIDR "
}
#  Creation of the Direct Connect Gateway
resource "aws_dx_gateway" "example" {
  name = "example-dx-gateway"
  amazon_side_asn = 64512
}
# Configuration of virtual interfaces
resource "aws_dx_private_virtual_interface" "example" {
  connection_id = var.dx_connection_id
  name = "vif-private"
  vlan = 4093
  address_family = "ipv4"
  bgp_asn = 65000
  amazon_address = "175.45.177.1/30"
  customer_address = "175.45.177.2/30"
  dx_gateway_id = aws_dx_gateway.example.id
}
# Association of the VPC with the Direct Connect Gateway
resource "aws_dx_gateway_association" "example" {
  dx_gateway_id = aws_dx_gateway.example.id
  associated_gateway_id = var.vpc_id
  allowed_prefixes = [var.vpc_cidr, var.onprem_cidr]
}
# Configuration of routes in the VPCresource "aws_route" "private_vif" {
  route_table_id = aws_vpc.main.private_route_table_id
  destination_cidr_block = var.onprem_cidr
  network_interface_id = aws_dx_private_virtual_interface.example.id
}
```

By complementing cloud expertise with the telco and connectivity ones, Sparkle, differently than any generalist AWS consulting partner, was able to addresses customer needs of hybrid cloud infrastructure, global performance, and simplified management of complex network with tailored, high-performing, scalable and secure network architectures.

AWS Direct Connect was complemented with Sparkle Ethernet Suite – Cloud Connect service.

Ethernet Suite is Sparkle's layer 2 solution aimed to address the needs of high-performing, transparent, secure and cost-effective end-to-end Ethernet connectivity of its customers.

By leveraging Sparkle state-of-the-art global Carrier Ethernet backbone, Ethernet Suite guarantees the maximum benefits in terms of coverage, bandwidth requirements, MTU and physical routing requirements.

Available in different service profiles, offering specific features to properly address and fulfill customer needs, Ethernet Suite provides:

- Multiple access technologies (fiber, copper, wireless) and standards (Ethernet, xDSL...) to guarantee the most capillary coverage, flexible bandwidth, from 2 Mbps to 100 Gbps options.
- Point-to-Point, Point-to-Multipoint and Multipoint-to-Multipoint network topologies.
- Service protection, diversification and specific routing.
- Jumbo frame and QoS.
- Outsourcing & equipment provisioning services worldwide: a single point of contact for the provisioning, installation, maintenance and network management on request.
- Flexible pricing scheme and contract models.
- Service Level Agreement, to guarantee high quality services.

The Ethernet Suite commercial profile selected to address customer project is Cloud Connect, Sparkle private and secure connectivity service, extending Customer network into the cloud capabilities of the main public Cloud Providers (Google Cloud, Microsoft Azure, AWS, Oracle, IBM Cloud, SAP Hana, Salesforce) throughout the world, thus allowing customer sites to exchange traffic with customer resources in the public clouds with a network experience more consistent than Internet-based connections.

Available as Layer 2 or Layer 3 solution, Cloud Connect provides high reliability, guaranteed and scalable bandwidth, high speed options, lower latencies, and higher security than typical connections over the Internet.

Thanks to Sparkle interconnections with the main Cloud Providers – in particular with AWS – and to the presence in all the main POPs worldwide, Cloud Connect provides private connectivity to the major Cloud Providers Data Centers globally.

Customers using more than a single public Cloud Provider technology, can benefit of Cloud Connect configured in a Multicloud modality (i.e. extending Customer VPN into the different cloud platforms employed).

Sparkle Cloud Connect solution can now be ordered with one click with the on-Demand functionality, offering customers a cloud-like service experience, based on self-modalities, on commercial and contractual flexibility and on a full visibility and control of the active services. What previously took weeks for ordering and provisioning, is now getting fast and easy.

Cloud Connect on-Demand allows customers to have full visibility and dynamic management of their services and to experience a new quoting and ordering approach, which significantly ease and speed up of the purchase administrative process: through a user-friendly Customer Portal, customers can access the inventory of their Ethernet Suite assets, and dynamically change the network configuration to reach the major public Cloud

Providers or simply adjusting the capacity of existing circuits to address variable traffic needs, even for temporary period.

Following customer's click-and-go submission, the full chain of Sparkle internal processes is automatically activated and aligned.

All the above Sparkle offering elements have been crucial to fulfill customer needs, and more specifically:

- Extended backbone and strategic partnership to grant the most extended coverage and deepest capillarity, to reach all customer premises located in different Countries.
- Redundant multiple paths backbone, to provide physically diverse circuits' routing, with no Single Point of Failure (SPoF), thus ensuring the business continuity and the respect of RTO/RPO targets in case of outages.
- State of art infrastructure to grant jumbo frame and high performance in terms of service availability, latency, packet loss and jitter.
- Advanced monitoring systems to ensure Sparkle Network Operation Centre intervention in case of service interruption or degradation.
- On-Demand functionality, providing customer with the possibility to autonomously and quickly change Cloud Connect bandwidth, also for temporary period, or order new Cloud Connect circuits (thus aligning the telco service customer experience with the cloud one) to ensure scalability and flexibility levels required by customer to address his fast-changing needs.

Several Key Performance Indicators (KPIs) were used to monitor network performance:

- **Latency**: the target was to maintain latency below 10 milliseconds for critical applications.
- **Packet Loss**: the goal was to keep packet loss under 0.1% to ensure data integrity.
- **Jitter**: the target was to keep jitter below 5 milliseconds to ensure consistent performance.
- **Bandwidth Utilization**: this metric was monitored to ensure that network links did not exceed 70% utilization, thus preventing congestion.

The methodology used to measure these KPIs involved continuous monitoring with AWS CloudWatch and third-party network performance tools. Regular reports were generated to track performance against the targets, and any deviations were promptly addressed to ensure optimal network performance.

In accordance with Sparkle's operational and security procedures, all security checks were conducted using the Cloudcheckr tool before releasing the solution to the customer. Additionally, several dashboards were set up to monitor metrics, define KPI thresholds alerts, and trigger alarms for the identified KPI parameters.

From a commercial perspective, Sparkle defined an offer that took into account not only the designed solution and the specified budget constraint but also the cost of the existing solution (including hardware, energy consumption, facilities maintenance, licensing, personnel etc.).

The official proposal was structured as a detailed breakdown of the individual services, presented as both upfront and ongoing costs, while also highlighting the comparative TCO analysis against the current on-premises infrastructure costs.

In addition, when presenting the offer to the customer, Sparkle shared a business value analysis, highlighting the business outcomes related to the solution adoption to justify the investment, with specific reference to:

- **Production Reliability**: improved performance towards the company's end customers, resulting in positive impact on retention and associated revenues.
- **Cost Efficiency**: cost reduction through operational efficiencies.
- **Increased Agility**: faster time to market for applications and services.
- **Scalability**: ability of AWS to scale without requiring significant upfront investments.
- **Innovation Enablement**: how serverless architectures and AI/ML tools open new business opportunities.

RESULTS AND BENEFITS

Thanks to Sparkle's solution, primarily based on AWS DRS, the customer successfully **strengthened its Disaster Recovery capabilities**, minimizing downtime and ensuring resilient and uninterrupted operations for its critical business processes.

The continuous replication of nine servers each month provided customer with a robust safety net, **protecting critical data and minimizing the risk of data loss**.

The combination of enhanced business continuity and a solid data protection strategy positioned the company to better navigate potential IT disruptions, **supporting its ongoing commitment to quality and reliability in the automotive industry**.

Sparkle's proactive guidance on cost-saving measures and local AWS expertise reinforced the importance of collaborative support in optimizing cloud services for both performance and cost-efficiency.