CASE STUDY:

Optimizing Network Connectivity for AWS hosted applications

SPARKLE
THE WORLD'S COMMUNICATION PLATFORM

ABOUT THE CUSTOMER

Sparkle has completed the implementation of a major project by deploying Multicloud & Cloud Connect Solutions for a top customer: a leading Turkish Group established in the 1970s, operating in the aviation, fuel, security, and logistics sectors.

To maintain its competitive edge and support its expanding operations, the company continuously invests in technology and infrastructure improvements. As part of its digital transformation strategy, the customer aimed to enhance the connectivity and reliability of its critical applications hosted on AWS.

CUSTOMER CHALLENGE

As the customer's reliance on cloud-based applications grew, the need for a more reliable, secure, and high-performance network connection became evident. The existing internet-based connectivity was insufficient to meet the demands of their mission-critical workloads, leading to unpredictable performance, security concerns and higher latency.

The company required a solution that would deliver consistent network performance, enhance security, and reduce latency between its datacenter and the AWS - EU Central (Frankfurt) region.

To address these challenges, the customer defined specific **availability (99.9%)**, **Recovery Time Objective (RTO)** and **Recovery Point Objective (RPO)** requirements to ensure business continuity and data integrity. RTO was set to a maximum of one hour, while RPO was established at 15 minutes, reflecting the critical nature of their operations.

To evaluate the effectiveness of the implemented solution, the customer established a series of Key Performance Indicators (KPI) to monitor connection performance and ensure the achievement of their objectives. The main KPIs measured included:

- **Availability**: measuring the availability of the connection, aiming for an uptime of 99.9%.
- **Latency**: monitoring the average latency of the connection between the local data center and the selected AWS cloud region, with a target reduction to less than 50 ms.
- **Throughput**: evaluating bandwidth usage against available bandwidth, with a target optimal usage of 70% to ensure safety margins.
- **RTO and RPO**: verifying compliance with defined RTO and RPO objectives, ensuring recovery times were consistently under one hour and 15 minutes, respectively.

SPARKLE SOLUTION

To address and fulfill all the expressed requirements, Sparkle designed Multicloud & Cloud Connect Solutions composed by:

1. **AWS Direct Connect** complemented by **Sparkle Cloud Connect service**, extending from the local Data Centre in Turkey to the AWS - EU Central (Frankfurt) region. This private connection bypassed the public internet, providing a more secure and controlled path for data transfer. The relevant 50 Mbps bandwidth was tailored to meet the specific requirements of customer's workloads, optimizing daily data traffic, and ensuring reliable and stable performances for critical business applications.

2. **AWS Transit Gateway**. Given that the customer operated multiple Virtual Private Clouds (VPCs), the provided solution included connecting Direct Connect to a Transit Gateway, which subsequently was then linked to the various VPCs. This architecture not only streamlined connectivity but also enhanced overall network management capabilities.

3. **Site to Site VPN**. Should the Direct Connect service be unavailable, it ensures redundancy.

4. **AWS CloudFormation**. As part of the infrastructure management strategy, Sparkle utilized CloudFormation to enhance operational efficiency, while ensuring that the infrastructure remained agile and responsive to changing business needs.

   By leveraging CloudFormation, Sparkle was able to manage the infrastructure as code, which offered several advantages:

   - **Consistency and Repeatability**: CloudFormation allowed the definition of customer's entire infrastructure in templates, ensuring that environments could be provisioned consistently across multiple regions or accounts without manual intervention.
   - **Version Control**: changes to infrastructure could be tracked through version-controlled templates stored in repositories like Git, facilitating collaboration among teams and maintaining a history of changes.
   - **Automation**: with CloudFormation's automation capabilities, Sparkle - and in future the customer - could deploy or update resources as a single unit (stack), reducing the potential for human error during deployments.
   - **Dependency Management**: CloudFormation automatically managed dependencies between resources during stack creation or updates, thus eliminating the need for manual sequencing of resource provisioning.
   - **Rollback Capabilities**: if an error occurred during deployment or update processes, CloudFormation could automatically roll back changes automatically to restore the previous stable state.

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.

Customer is also served with Sparkle colocation service in Turkey, having proprietary equipment hosted at Sparkle DC of Istanbul: this was an additional customer site and service component that Sparkle addressed and included in the overall design and solution provided.

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

1. Extended backbone and strategic partnership to grant the most extended coverage and deepest capillarity, to reach all customer premises located in different Countries.
2. 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.
3. State-of-the-art infrastructure to grant jumbo frame and high performance in terms of service availability, latency, packet loss and jitter.
4. Advanced monitoring systems to ensure Sparkle Network Operation Centre intervention in case of service interruption or degradation.
5. 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.

Sparkle Turkey DCs, to host customer equipment and fulfill customer need of neutrality, security and 24/7 Security Operation Centre (SOC) and Network Operation Centre (SOC) support.

Upon the completion of the solution implementation, the results achieved were extremely positive in terms of:

- **Availability**: the connection achieved an uptime of 99.95%, ensuring excellent reliability.
- **Latency**: the average latency was reduced to 30 ms, exceeding the initial target.
- **Throughput**: the bandwidth usage stabilized around 65%, demonstrating effective resource management.
- **RTO and RPO**: both objectives were consistently met, with average RTOs of 30 minutes and RPOs of ten minutes.

To provide the customer with a comprehensive overview of the network performances and ensure alignment with their operational goals, Sparkle designed a consistent platform to effectively measure the KPIs effectively, composed of different AWS tools:

- **Amazon CloudWatch**: provides real-time monitoring of application performance metrics such as latency, availability, and throughput, with the ability to create customized dashboards for easy visualization of these KPIs.
- **AWS Config**: used for tracking changes in resource configurations over time, helping to ensure compliance with defined RTO/RPO requirements.

- **AWS CloudTrail**: this service monitors the API calls made within the customer's AWS account, providing insights into operational activities that could affect the relevant performances.

From a commercial perspective, Sparkle defined an offer that took into consideration not only the designed solution and the expressed specific 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 detailed breakdown of the individual services, presented as both upfront and ongoing costs, and included a comparative TCO analysis against with the actual 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 Increase**: improvements in network performances and security led to better performances of customer's critical AWS-hosted applications, resulting in a positive impact on business growth and overall digital transformation.
- **Increased Agility**: faster time to market for applications or services.
- **Scalability**: how AWS scales without requiring heavy upfront investments.
- **Innovation Enablement**: how serverless architectures or and AI/ML tools open new business opportunities.

RESULTS AND BENEFITS

The dedicated 50 Mbps connection significantly reduced network latency and increased the reliability of connections between the customer's Data Center and the AWS cloud region, resulting in **enhanced application performance.**

Furthermore, the connection, consisting of Sparkle Cloud Connect and AWS Direct Connect, **increased security** by providing a more secure data transfer pathway compared to traditional internet-based connections, thus reducing exposure to security threats.

With a predictable and dedicated connection, the customer benefits from **improved cost efficiency** for its AWS-hosted applications, avoiding the unpredictable charges often associated with data transfer over the internet.

All these results enabled the company to successfully complete a crucial step of its digital transformation, supporting growing business operations with confidence and laying a solid foundation for its continued cloud journey.