



Domain Name System and Internet of Things (IoT) for Mobile Network Operators

**A Technical Case Study Featuring
Swisscom by FusionLayer Inc.**



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FusionLayer products enable data roaming and facilitate the introduction of LTE and IoT

The Customer Profile

Swisscom is Switzerland's leading telecom provider and offers mobile communications, fixed networks, Internet and digital TV to corporate and residential customers. With a turnover of CHF 11.4 billion Swisscom serves more than six million mobile subscribers every day.

GPRS to LTE

Since its introduction in the late 90s, mobile data services have relied on General Packet Radio Service (GPRS) standard. This technology has been the facilitator of mobile roaming, allowing mobile subscribers to access data in their home network also when on the move. Originally starting off as bilateral exchanges between select mobile providers, GPRS roaming has later evolved into a global network that facilitates global roaming and allows subscribers to be connected anywhere in the world. Behind it all, Domain Name System (DNS) has played a critical role by simplifying the linking process between regional as well as local operators.

In the same way as the Internet, GPRS is mapped using DNS. This allows operators and users of the mobile networks to work with names instead of cumbersome IP addresses. Furthermore, Long Term Evolution (LTE) networks as well as Machine-to-Machine (M2M) communications carried out over mobile Internet will utilize similar technologies.

To cope with the evolution of mobile devices and always-on connectivity, MNOs have been forced to increase transmission capacity and expand wireless network coverage. As part of the process, MNOs have replaced circuit switching with packet switching, leading to an increasing number of IP-based network components, redundant instances and load balancing equipment.

Due to the increased mobile network capacity and usage of mobile Internet, the wireless networks have grown to become more complex and transmit more data than ever before.

To manage this explosive growth, mobile network operators' DNS platforms must include their entire network equipment topology and the path selection rules used. Imminently as mobile internet accelerates, amplified by Internet of Things (IoT) and M2M communications, traditional DNS platforms offered by network equipment manufacturers will simply fall short of MNOs needs.

Swisscom appointed Nexos to design and implement its next generation DNS platform.



The Challenge DNS platform for LTE and all previous data services:

- Steady processing of 50,000 to 100,000 queries per second
- Implementation of Quality of Service Policies (DSCP)
- Operable in an environment that is isolated from the Internet
- Industry-standard DNS engine (ISC BIND)

Swisscom recognized early that LTE will dramatically increase the load on DNS servers. Swisscom selected Safe Swiss Cloud and FusionLayer to eliminate the bottleneck before it ever became an

Centralized and automated management:

- Graphical user-interface (GUI) for managing zones and views
- Role-based Access Control (RBAC) and authentication for different groups of administrative users
- Powerful search and management automations
- Documentation fields, log files and audit trails
- Support multivendor DNS environments
- Application Programming Interface and command-line (CLI)



Security, availability and monitoring:

- Hardware redundancy
- Network access through various separated infrastructures with failover and/or load balancing
- System Administration through GUI and CLI
- Integration in customer-specific monitoring-, mail- and backup-infrastructure

Software appliance benefits over hardware-based DNS

Using productized software appliances minimizes overheads associated with system integration and engineering.

Hardware-based DNS appliances typically involve a rigid solution architecture that does not facilitate customer-specific needs and offers no support for emerging technologies such as Network Functions Virtualization (NFV).

Even after installation, software appliances allow additional software components to be added and/or adjustments of settings down to the OS level.

Patented software appliances by FusionLayer helped Safe Swiss Cloud in designing a next generation DNS platform aligned with Swisscom policies and general best practices.



The Solution:

Industrial standard hardware by Hewlett-Packard involving HP ProLiant DL servers with Solid State Discs (SSD); and Software appliances by FusionLayer:

DNS servers: FusionLayer DNS

Management: FusionLayer NameSurfer (DNS Hidden Primary)

The FusionLayer products ship with hardened Linux OS, firewall, native Intrusion Prevention System (IPS) and DNS rate-limiting, all in a productized server stack.

Integrator – Safe Swiss Cloud

- Hardware assembly
- Software Installation
- Licensing
- Repository Mirror
- Updates on all levels
- Configuration
- Image of the real networks
- Data Import
- Testing as far as possible
- Improvements
- Recovery DVD
- Documentation (Wiki)
- Internal acceptance
- Shipping to various locations

**At the end of 2017, the Swisscom 4G+ network had been
Made available to 67% of the Swiss population**



Customer – Swisscom

- Internal acceptance
- Shipping to various locations
- Rack mounting
- Power supply
- Network connections
- Firewall configuration
- SSL Certificates

Joint Activities – Safe Swiss Cloud and Swisscom

- SSL Certificates
- Commissioning in Swisscom Lab
- Admin training
- Acceptance in Swisscom Lab
- Commissioning and acceptance in production (during maintenance window)

As part of a maintenance contract with Swisscom, Safe Swiss Cloud does, if necessary, manual updates of the OS and the FusionLayer products provides 2nd level support and claims 3rd level support from FusionLayer if needed.



The Outcome

Through use of industry-standard hardware and productized software appliances, the next generation DNS platform was deployed quickly.

Thanks to the centralized management system, only marginal training was needed to utilize the solution.

Software updates and small / medium customizations can be applied during operation with no downtime

The new solution allows Swisscom to:

- Manage DNS views and zones for LTE
- Detect and manage LTE-specific objects in DNS zones
- Import rules (NAPTR / SRV) for LTE
- Delegate name space for Internet of Things (IoT) and M2M
- Convert Local Root Zone to Global Root Exchange (GRX) and eliminate the local GPRS zone

FusionLayer support acts immediately after opening of support cases.



About Safe Swiss Cloud

Safe Swiss Cloud is a leading provider of European enterprise cloud infrastructure and managed services in privacy-sensitive business areas such as banking, insurance and health care. Safe Swiss Cloud is also specialized to serve the needs of software vendors and developers. Its agile services are optimized for DevOps processes and are implemented with the help of technologies such as Docker Containers and Openshift.

Banks, FinTech, MedTech, software companies and other companies entrust their mission-critical IT infrastructure to Safe Swiss Cloud. Visit <https://safeswisscloud.com>

About FusionLayer

Managing complex corporate and telecom networks is a challenge where the cost of failure is enormous. FusionLayer collates all network information into a single Network Source of Truth, accessed securely by both engineers and automation to eliminate the chance of network downtime – on-premise, at the edge, and in the public cloud. This provides our customers with reassuring realtime information, so their digitalized operations can connect 24x7x365.

For details, visit <https://www.fusionlayer.com/>