



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

A Technical Case Study Featuring
Swisscom

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

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 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.

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

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.

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

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.

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)

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

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

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.

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: Nixu NameSurfer (Classic IPAM)

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

Integrator - Nexos

- ✓ 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

Customer - Swisscom

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

Joint Activities - Nexos and Swisscom

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

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.

At the end of 2013, the Swisscom 4G/LTE network had been made available to 85% of the Swiss population.

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

As part of a maintenance contract with Swisscom, Nexos 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.

About Nexos

Nexos provides medium and large companies with consulting services and solutions in the areas of Security, Automation, UNIX / Linux, Microsoft infrastructures, Networking and Telecoms. The services and solutions are also available as Managed Services, Outsourcing and Cloud Services. Visit <http://www.nexos.com/>

FusionLayer support reacts immediately after opening of support cases.

About FusionLayer

FusionLayer streamlines cloud and application delivery in next generation data centers. The company's vendor agnostic technology bridges the gap between network infrastructure and orchestrated cloud and network functions virtualization workflows. Nine out of 10 of the world's largest service providers leverage FusionLayer.

For details, visit <http://fusionlayer.com>