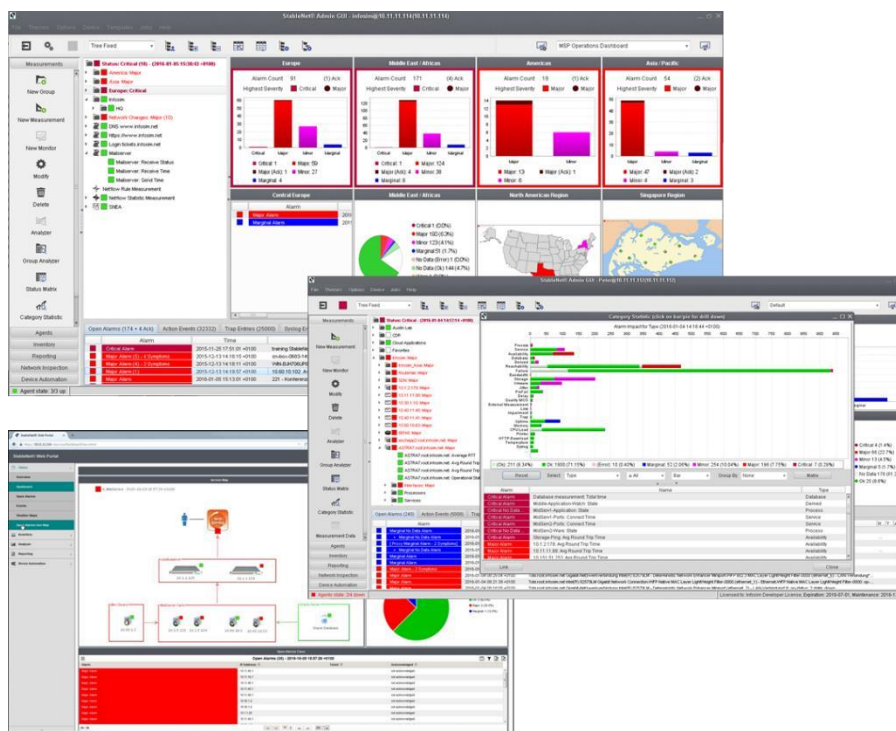


Infosim® StableNet®

Unified Network, Services & IT Management for Telco/MSP, Cloud and IoT Service Assurance

Executive Overview

How the StableNet® Telco solution can help to ensure the deployment and services operation.



Prepared by: Infosim®
 Infosim GmbH & Co. KG
 Landsteinerstraße 4, 97074 Würzburg, Germany
 +49 931 20592-200, Fax +49 931 20592-209
www.infosim.net

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 Author: Peter Moessbauer / Infosim®
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Unified Network & ICT Management for Telco/MSP, Cloud and IoT Service Assurance

Today's challenge of transforming Telco networks and services into "All IP" and the convergence of fix and mobile networks, induces a lot of extra effort and cost to get a solid cross silo management NG OSS in place.

To handle all of these, by expanding the commonly used OSS "Management Dinosaurs" and "Silo" focused management solutions, is a tedious task and does require usually a larger investment - with often insecure results.

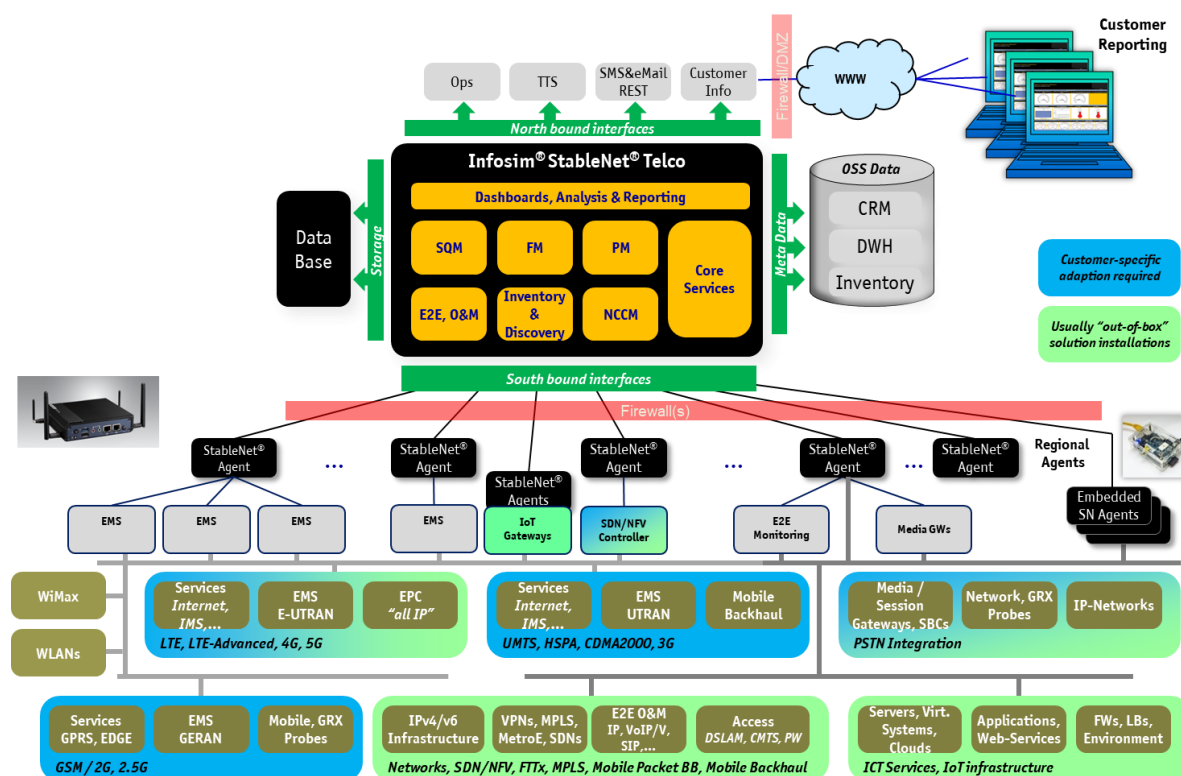
These "OSS-Management Dinosaurs" had been usually built on a bundle of not well-integrated, bought in applications, which in the end drive the TCO up and slow down the roll-out of new services and revenue-streams.

This is getting even worse by the demand to not only manage the fix and mobile networks, but also to include services management for VoIP and IPTV, for the internal IT systems, for applications, DBs, FWs, IoT Gateways with IoT sensors and actuators, cloud services, up to the monitoring of key application services for business customers.

What we see frequently with Telcos and MSPs is that the "Zoo of Management Systems" is even growing, as new services are being rolled-out.

To come up with a better approach, Infosim® had developed StableNet® Telco from 2003 onwards, as their auto-configuration and consistent 3rd generation, cross-vendor, cross-technology, cross-silo, OSS PM/FM/Auto Root Cause/NCCM solution.

The key driver was to address these complex Telco and very large service and network challenges in a much more efficient way, and to ease the roll-out/optimization of services.

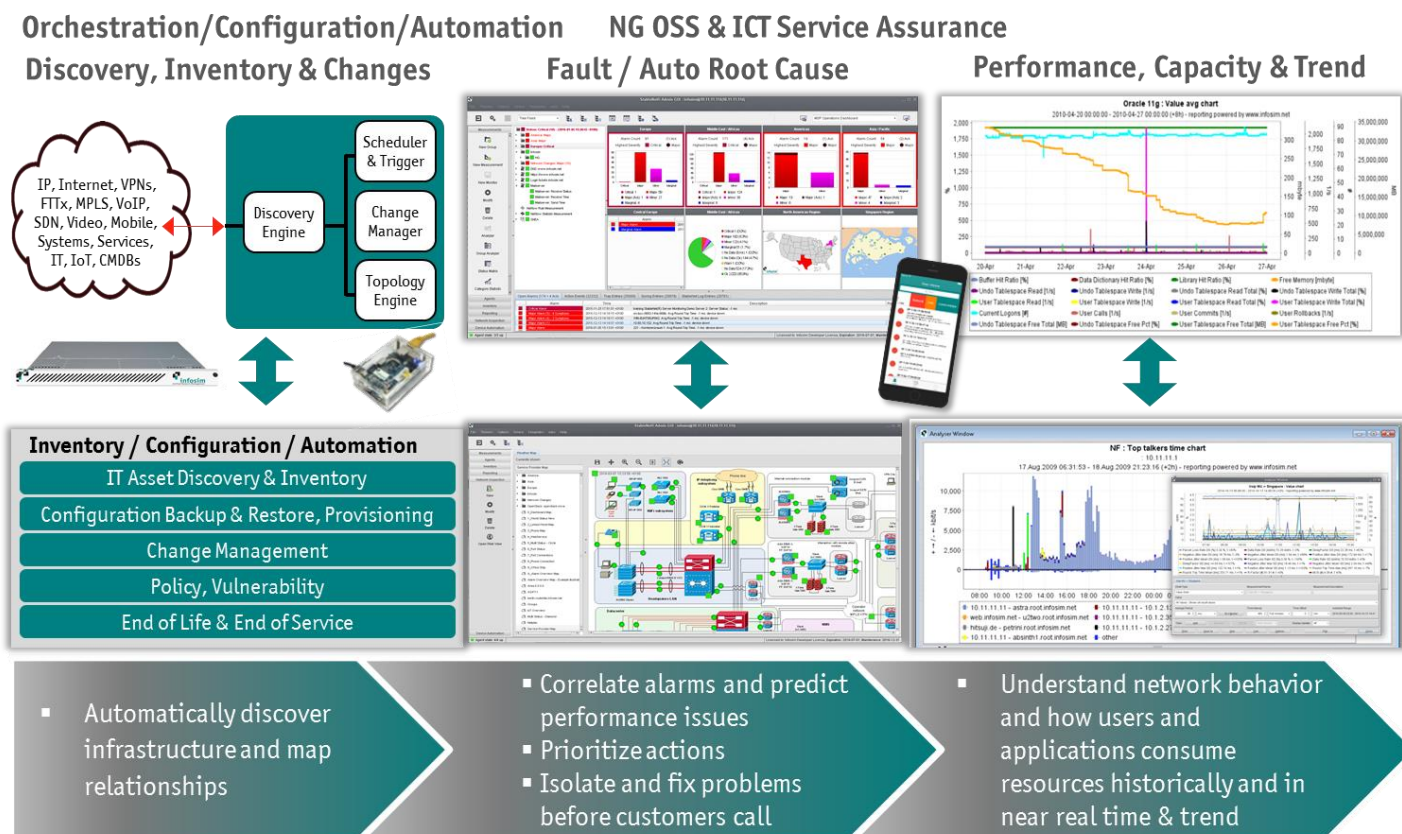


Unified Network, IT and Services Management distributed solutions architecture

Unified Network, Services Management and IT-Infrastructure Management

StableNet® Telco does integrate Performance-, Fault-, automated Root-Cause-, Configuration- and Inventory Management within one consistent, but still modular Telco NG OSS solution.

Thus it does make services-oriented management operations, including installation, deployment and operations much easier and reduces the total cost of ownership (TCO).



StableNet® management for Telco/MSP networks, fix and mobile infrastructure elements, SDN/NFV, up to IT, ICT systems, business process monitoring integration and IoT monitoring and configuration, does allow reducing the usual “Zoo of Management Systems” and also does allow speeding up services roll-out, by highly automated management.

It does support the handling of Mass-CDRs, large numbers of IP and MPLS network elements, NetFlow, systems and servers and does scale to very large distributed Telco/MSP/SaaS and Cloud environments.

StableNet® does also support the distributed deployment of large numbers of small management agents to be applied per small site. This allows the on-site and cost-efficient central End-to-End monitoring for large numbers of distributed small sites and offices.

If you are looking for an alternative e.g. to first replace a legacy performance management solution, then legacy fault management, this can also be done step by step, per software module license.

What makes the solution so efficient?

Key Telco/MSP requirements are supported out of the box

- Efficient mapping of Telco/MSP/IT requirements to the management solution.
- Automated cross silo vendor-agnostic monitoring and reporting.
- Monitoring for distributed small sites and multi-customer services.
- Multi-tenancy, multi-time zone / business hours / maintenance window support.
- Automated discovery of the IP- and IT infrastructure and via inventory CMDBs.
- IPv6 support, SNMP v1, v2c, v3 parallel operation, non-SNMP data support.

Automated Root-Cause Analysis

- The Root-Cause Analysis (RCA) is automatically activated after inventory discovery and does
 - pinpoint the causing element or performance issue, and in addition does
 - highlight the impacted areas.
- RCA does also support meshed and multilayer networks via the discovered topology.
- The single root-cause alarm does allow triggering and clearing trouble tickets directly without user intervention.
- For trouble shooting, real time reporting, device access and configuration functions are supported.

Online report design

- Easy online system-aided report design does allow to create operations reports ad-hoc.
- Supports multi-graph reports and online comparisons, e.g. compare "Month A to Month B".
- Dashboards can be created to provide overall operations status views.

Security, audits, integration, compliance

- Required security features are supported on all levels, for users/groups/customers, audits, and encrypted agent to server communication, via a single firewall capable IP port.
- New devices types can be adapted to the whole 3 in 1 system very quickly.
- Own scripts can be added for CMDB integration support with limited efforts.
- It is an open system for integration with the existing OSS environment, supports Web Services integration / REST interfaces and is TMF NGOSS and ITIL® compliant.

Cutting down CAPEX and OPEX

- Consolidating the "Zoo of Management Systems" to the required operations scope of a unified overall management and services assurance solution, together with a set of attached and integrated, dedicated vendor specific EMS, will does typically gain a strong reduction in OPEX and CAPEX in the follows.
- Cutting down repeated annual update integration cost
By using the already integrated unified Performance-/Fault-/Configuration-Management solution StableNet®, the costs of repeated integration efforts to integrate the annual updates of the management systems can be massively cut down.

- Maintenance cost reduction by eased OSS consolidation
Telcos often spend high maintenance fees for multiple management systems installed in parallel. Costs can be usually cut down, as this unified solution does not cost up for three, and as the management configuration is widely automated, it does usually not take very long to replace other OSS and thus optimize your operations and TCO.
- Acquisition of new business areas, companies and networks
The solution is also designed to allow an eased network- and services management integration whenever your organization does make extension into service areas with new elements, because of the very flexible and secure remote agents concept.

Solution Support

e.g.

- Monitored discovery / tracking of networks and server devices and EMS systems roll-out,
- Monitoring the “building blocks” of your services & rollout,
- Unified monitoring and reporting across fix IP and mobile LTE networks,
- Direct monitoring on network, systems, IP, MPLS, and VPN infrastructure, VoIP systems, gateways, environmental systems,
- on top monitoring of EMS e.g. in the mobile services space (requires usually some vender / client specific adaptations and configuration),
- Services monitoring via advanced interactive services modelling capabilities,
- E2E reference monitoring solutions for IP, VoIP, IPTV, URL, DNS, IP-SLA, RPM etc.,
- Support of configuration and change management automation e.g. mass configurations and checking of network devices,
- Support of interworking with orchestration, provisioning and MANO systems, and multiple more, which we can check when you outline your challenges to us.

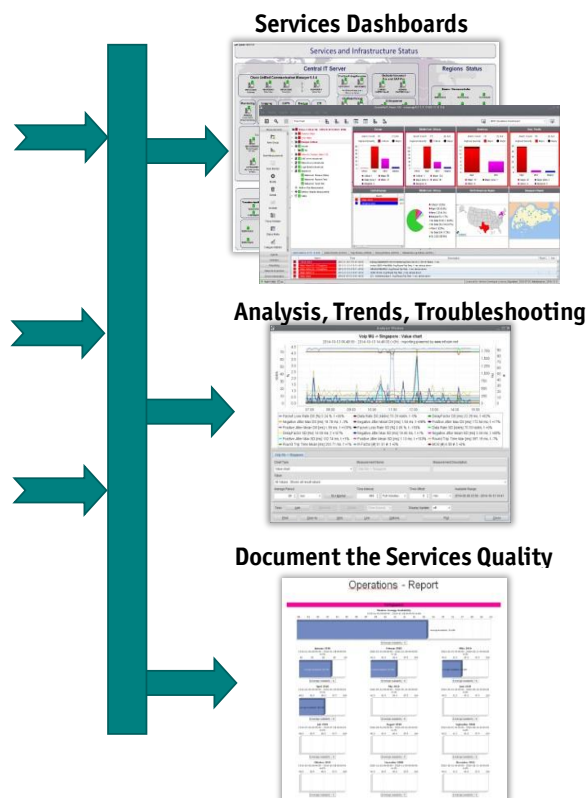
Monitoring the “building blocks” of your services & rollout

Services can be e.g. visualized and reported in the form of Services Dashboards and Root Cause driven Alarm Dashboards.

Drill down into services details and performance graphs does allow for real time trouble shooting. Dedicated services reports can be also distributed by scheduler or on demand to the target users.

StableNet® Telco is typically used for:

- **Provider Internal systems & services monitoring, and physical inventory tracking**
 - Network and systems discovery and CMDB import/export – tracking physical roll-out and activation
 - Infrastructure and OSS / operations IT systems within the distributed infrastructure
 - OSS incl. SDN/NFV and BSS systems platform availability and performance monitoring
 - Access systems network monitoring
 - Backbones, transport and distributed networks
 - SLA/OLA, services quality monitoring and reporting
 - Key facility, environmental and support systems, e.g. UPS, access, DC cooling
 - Very powerful alarm and syslog integration, processing, and actions support
 - Reduction of the “Zoo of management” systems
- **Provider External systems and interworking monitoring**
Monitoring gateways and interconnection with external provider networks, e.g. via “reference system use” and “reference user” monitoring
- **E2E Signaling, VoIP and data services**
E2E encoded reference traffic injection and monitoring
- **E2E Applications**
URL/HTTP, DNS STM on applications
- **Provider Internal**
 - Telco / MSP / OSS / SDN/NFV
 - IT, ICT, IoT
 - Fix / Mobile / Converged networks
 - Backbone / Transport
 - Access networks
- **Provider External**
 - Sub-Provider,
 - Peering networks,
 - Gateways, etc.
- **Services E2E**
 - Signaling, VoIP and data services
 - E2E: Application services, IoT connectivity
- **Inventory**
 - Topology / Connectivity / Status
 - Devices,
 - Configuration
 - Provisioned Services

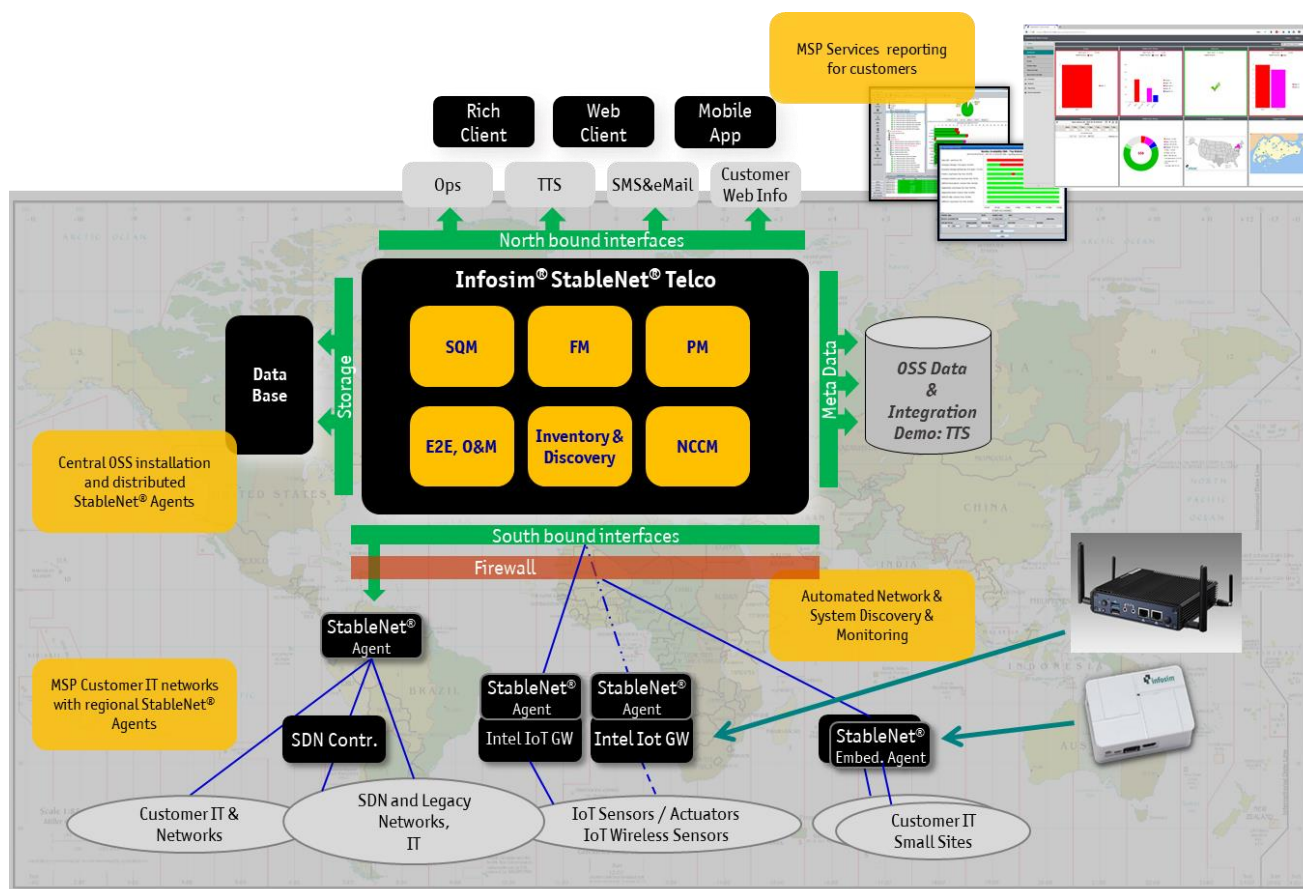


Deployment examples

Examples about typical utilization of StableNet® Telco are shown on the following pages.

The connection of the different management domains e.g. Telco/MSP networks, fix, mobile, backbone, IoT, MSP services into a central StableNet® management solution is usually done via the deployment of StableNet® Agents per managed services domain.

MSP-Services, Managed Services

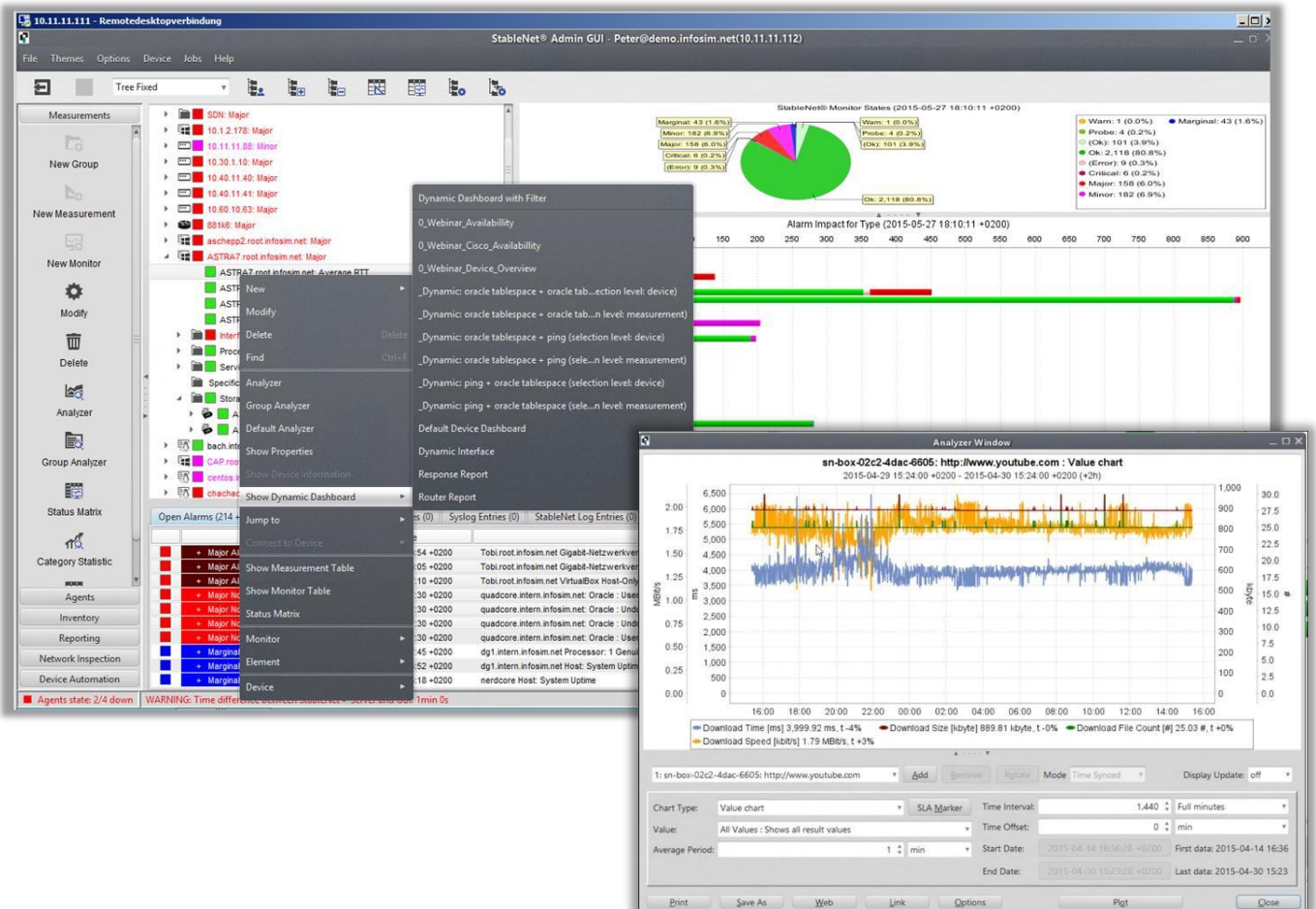
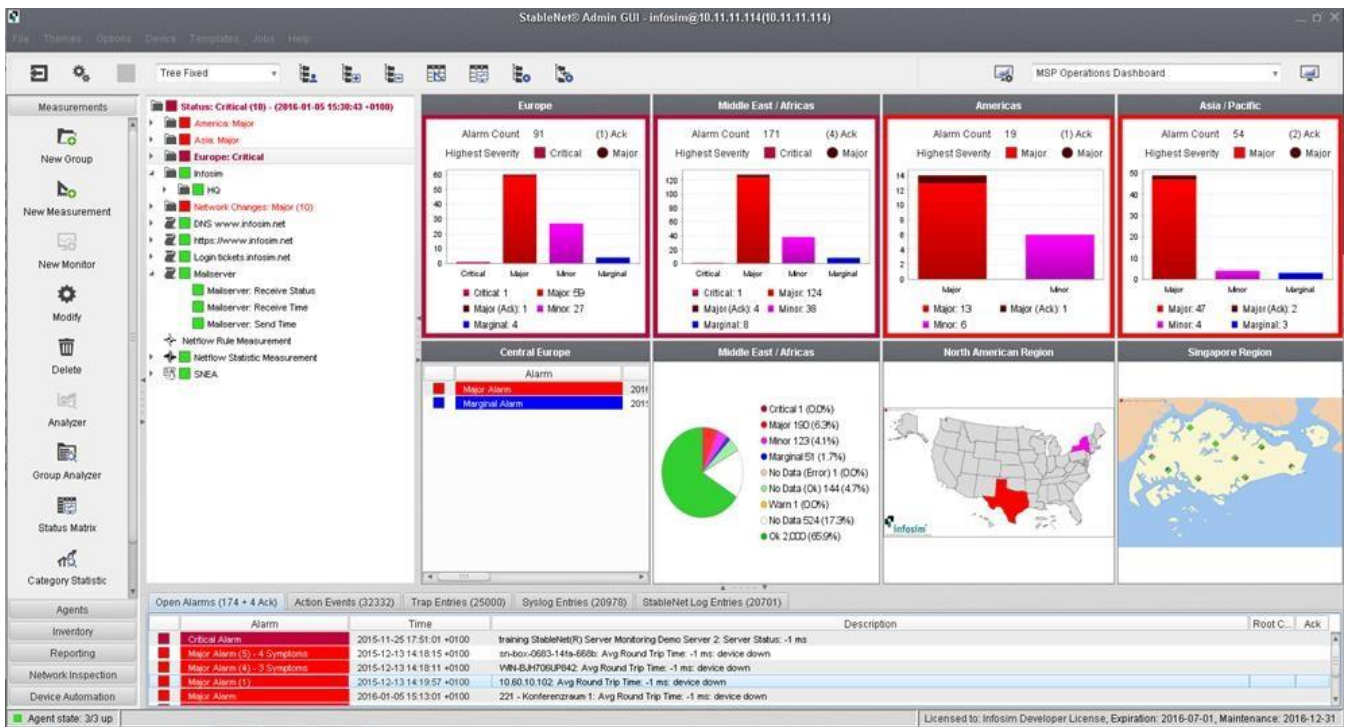


A central StableNet® Telco server installation allows to manage and monitor distributed managed domains e.g. Telco network or managed customer via central or distributed StableNet® agents.

The majority of the management workload are performed within the StableNet® management agents. This does ensure the very high scalability for StableNet® management solutions.

Small “Embedded StableNet® Agents” (SNEA) on an ARM Banana PI base and StableNet® Agents on IoT industrial Gateways, do even allow to do cost efficient extension of the managed solution across large numbers of small offices (SOHO) and small distributed operations sites e.g. Base Stations, DVBT towers etc.

Services and Network and Performance Alarm Status & Analysis



ICT & Application Performance Monitoring (APM)

StableNet® Telco can be also applied to monitor distributed ICT environments:

ICT Systems

- Windows®, Linux, AIX®
- IBM® e.g. iSeries, pSeries, xSeries
- HP® e.g. Proliant series
- Virtual Systems, VMWare®, LPAR®
- Database monitoring
- Storage systems monitoring
- Hardware and environmental monitoring
- DCIM Monitoring / IT Racks
- Exchange/Mail server monitoring
- Web application server monitoring
- Web Services E2E monitoring
- IoT Gateway & sensor monitoring

ICT Infrastructure

- Load Balancers
- Firewalls
- DNS, URL monitoring
- E2E VoIP/Multi-Media monitoring

Networks

- IP4/6 Networks, LAN, and WAN,
- L2/L3 VPNs, MPLS
- IP SLA, RPM, NQA
- Netflow
- Multi Tenancy environments



ICT Infrastructure Discovery & Management Integration

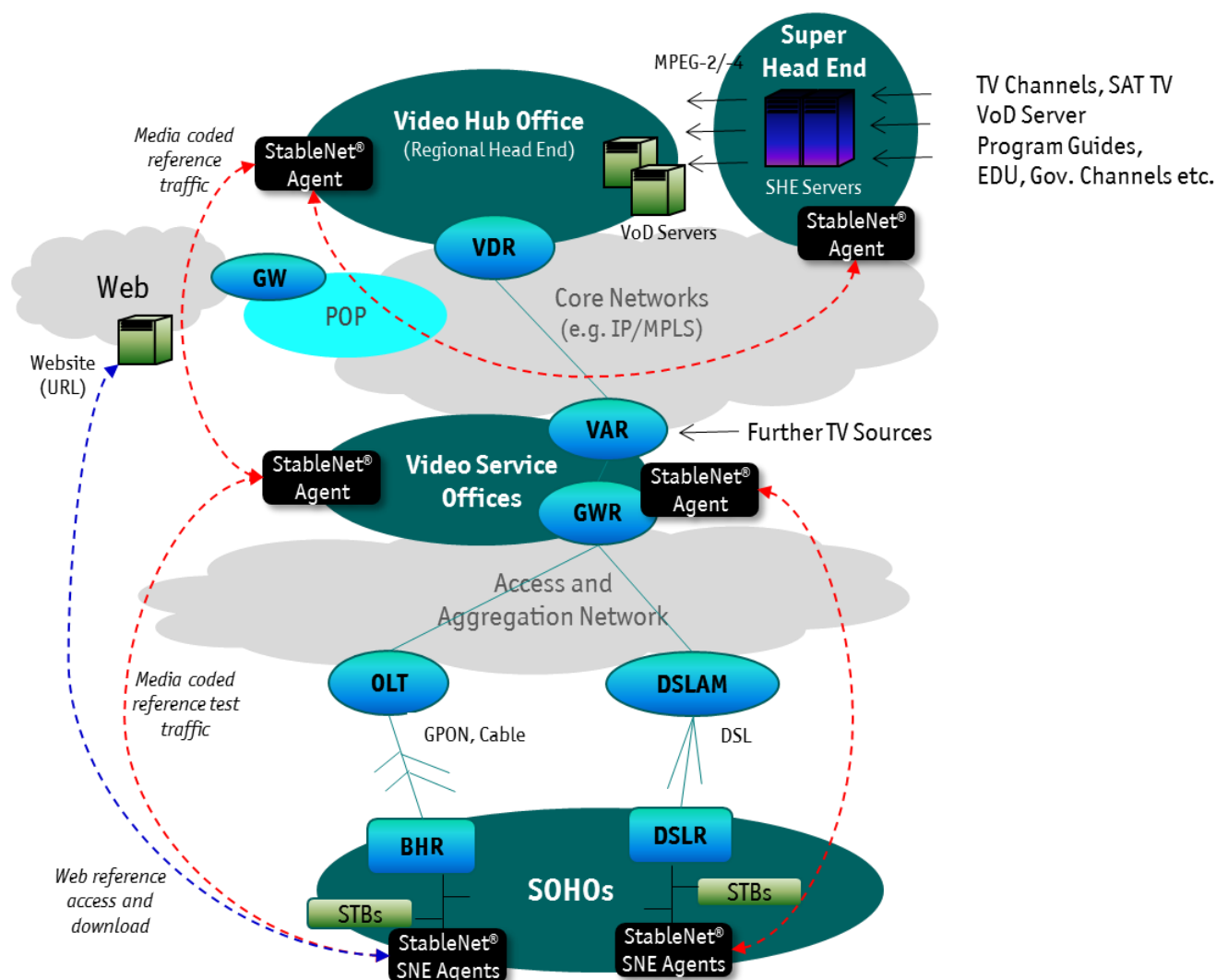
- Discovery of Systems, Server, ICT Infrastructure, Network Topology, Connectivity, and Bandwidth.
- Standardized integration interfaces with CMDB, ITAM, Incident Management Systems,
- REST e.g. Visualization, Links, Inventory, Workflow

Customer Services Monitoring: Example Multimedia Services

An example for distributed small StableNet® Agents (SNEA), is the reference monitoring of the IPTV/Multimedia services distribution infrastructure. Independent of the user and varying IPTV content, the transported multimedia services quality can be efficiently monitored from “reference user” spots.

Monitoring solution scope

- Monitor the availability and performance of the multimedia distribution network.
- Monitor the accessibility, performance and trends to services on the web from a reference user’s perspective.
- Signal and report technical QoE, and automate the generation of Trouble Tickets



IoT monitoring, Service Assurance and Configuration Management

In IoT / MSP environments StableNet® Telco is typically used to securely monitor:

Industrial IoT

- KPI and Actuator Data access via Intel IoT Industrial Gateways
- Use of industrial GW with industrial protocol and interfaces support e.g. SCADA
- Secure management access
- Automated vulnerability checking

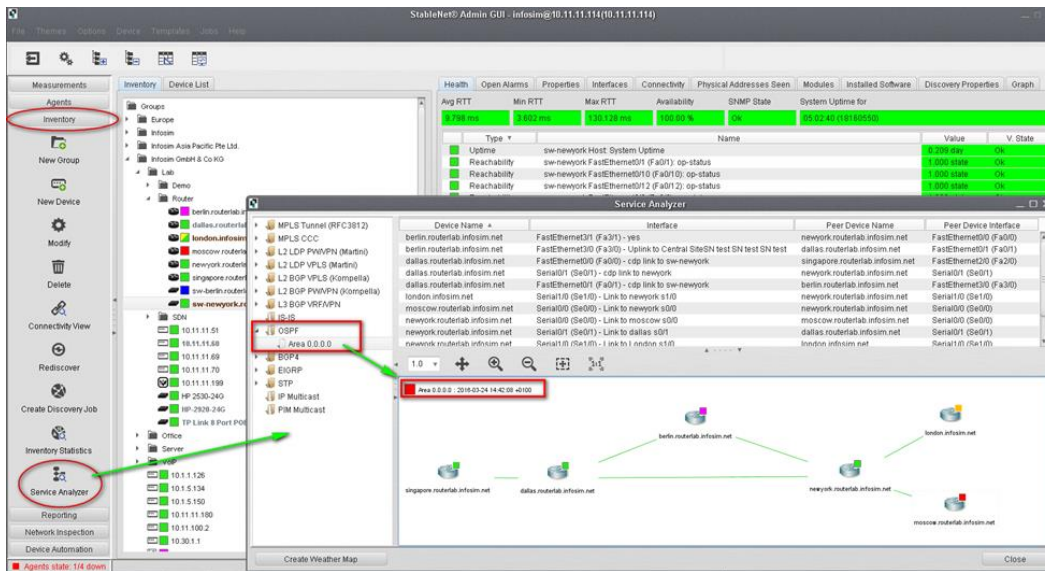
Devices, Systems, IoT KPI Metering

- SMART Metering
- Environmental Systems
- Temperature, Heating / Cooling
- Generators, Diesels
- Security, Intrusion Detection
- Narrow Band / Low Power Sensor data



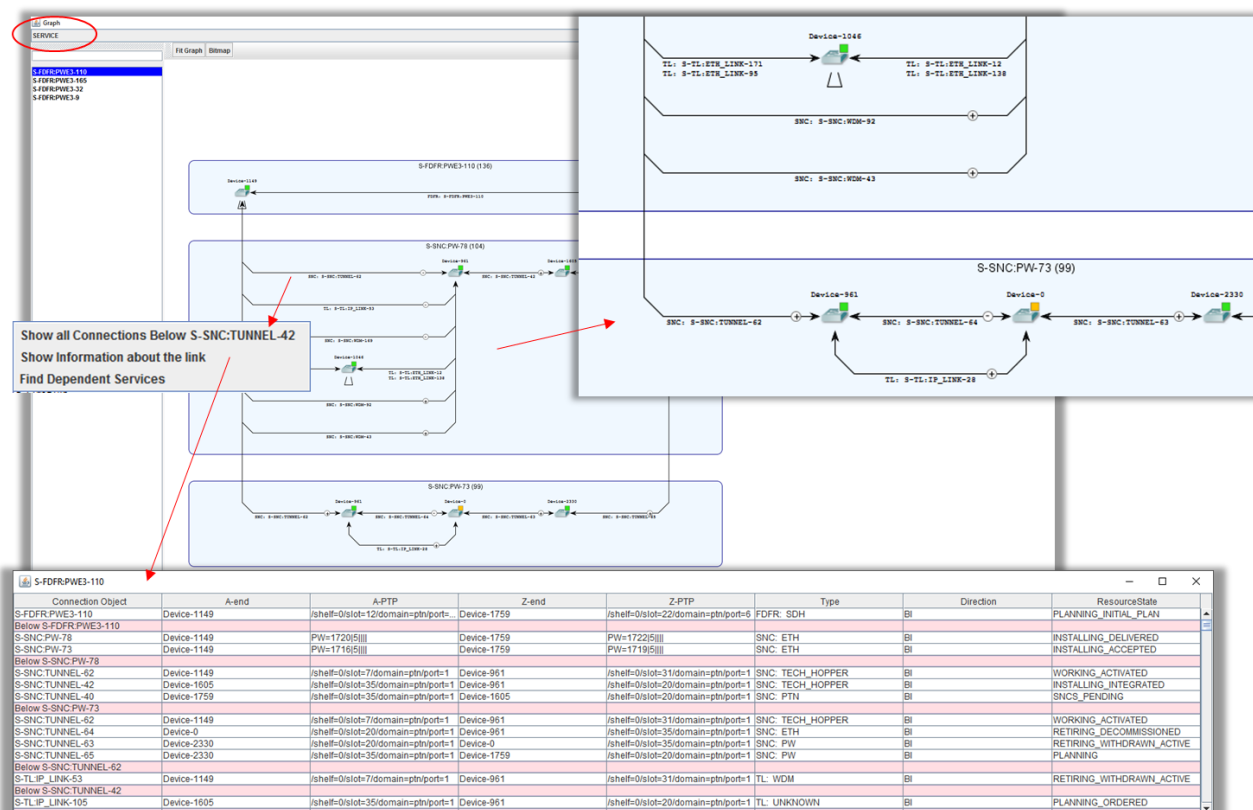
Monitoring network services E2E

The StableNet® Service Analyzer is a fully integrated optional add-on module for StableNet® Telco to visualize network services E2E e.g. MPLS, BGP, L2-/L3-Tunnels, Pseudo-Wire etc.



The network connectivity is being discovered via network devices and via vendor Element management System (EMS) by StableNet®.

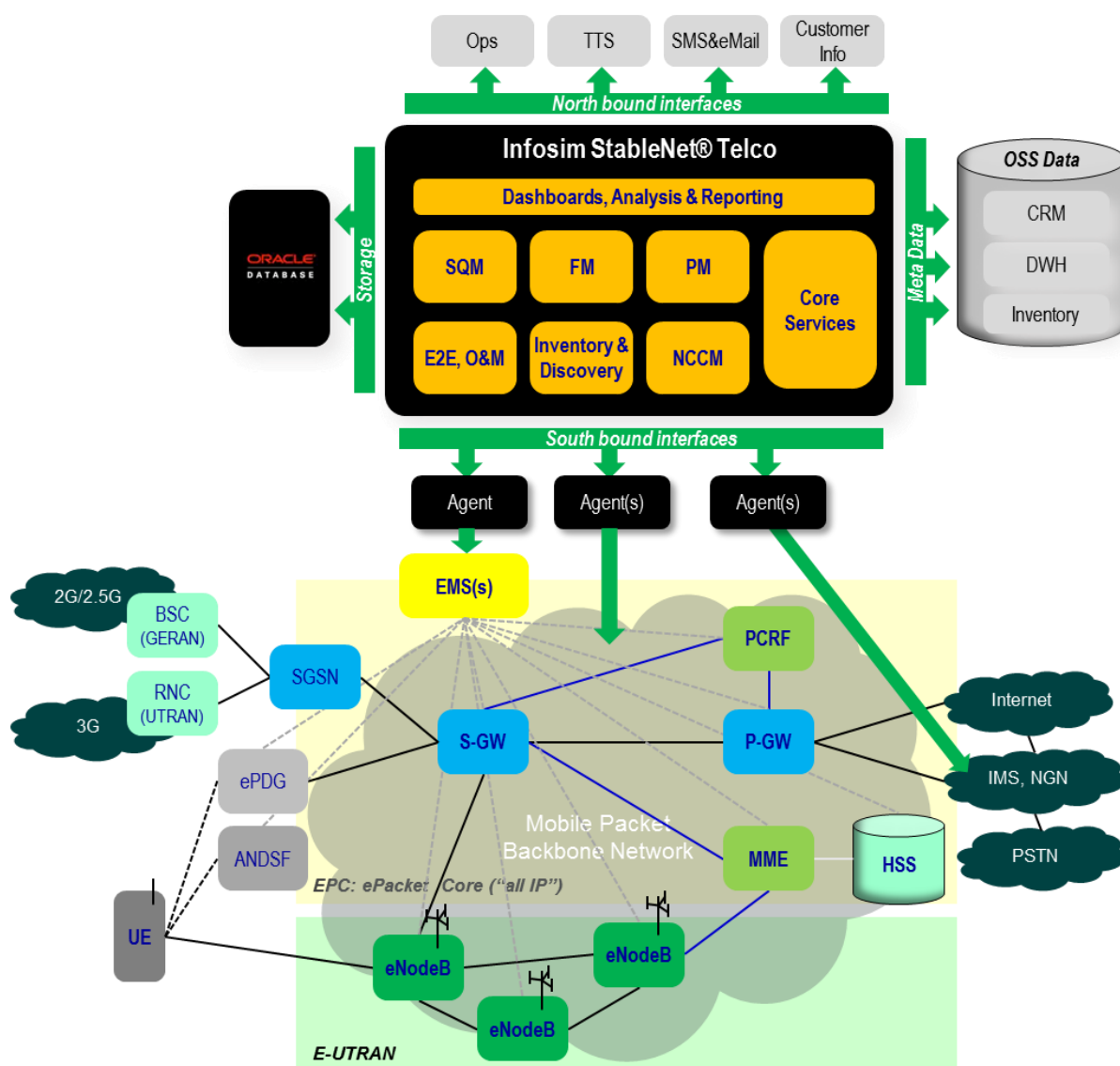
Depending on the discovered topology, connectivity and connectivity information retrieved via the connected EMS, this very advanced cross-vendor, cross-technology, cross-silo Service Analyzer does allow drill-down and analyzing sub-layer connections.



Mobile / 4G LTE

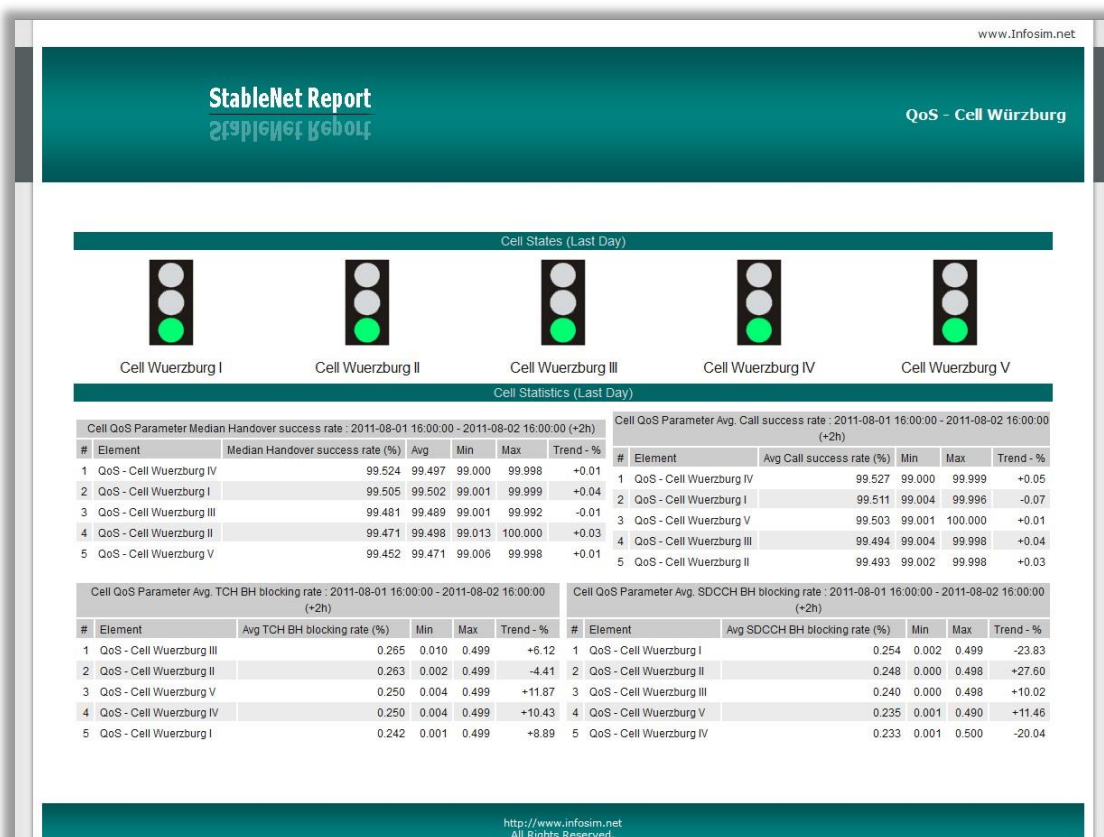
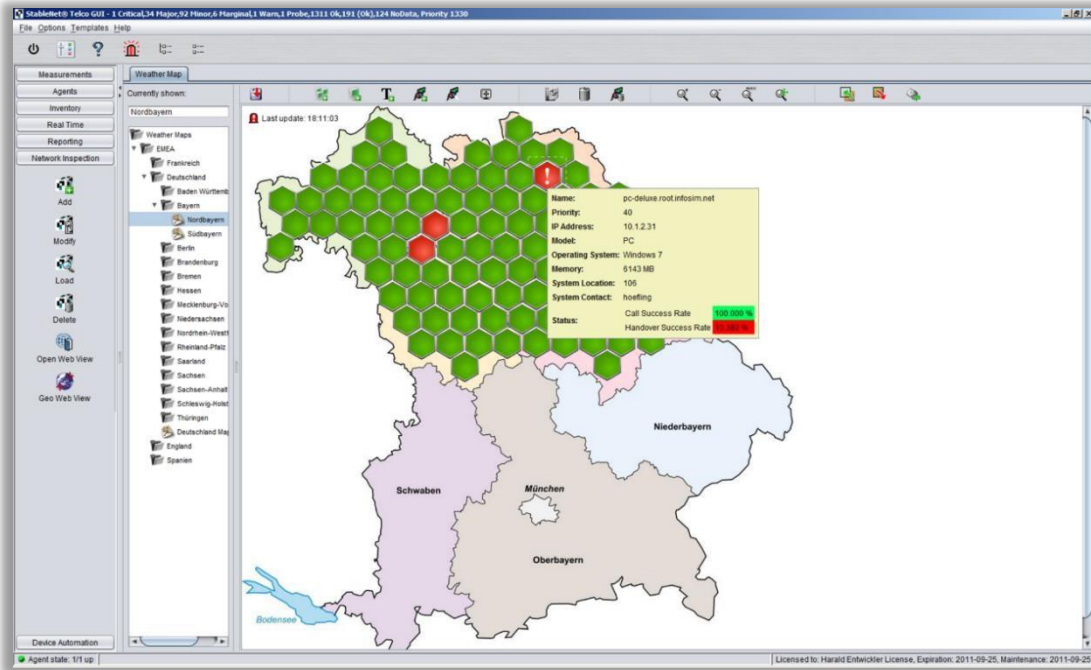
In mobile services environments StableNet® Telco is typically used to monitor:

- Mobile Packet Backbone
- Mobile services via the Element Management Systems (EMS) e.g. Ericsson OSS-RC, Huawei M/U 2000 by integration of inventory, topology and performance data monitoring.
- Direct monitoring of network devices, systems and data base platforms e.g. backbone router, switches, gateways, SBCs, WiMax router, WiFi controller, environmental systems etc.
- E2E services reference monitoring
- xDR monitoring via 3rd. party mobile services probes integration e.g. for 2.5G/3G environments
- Narrow Band IoT sensors and actuators monitoring via Intel IoT industrial Gateways



Mobile Services Monitoring Examples

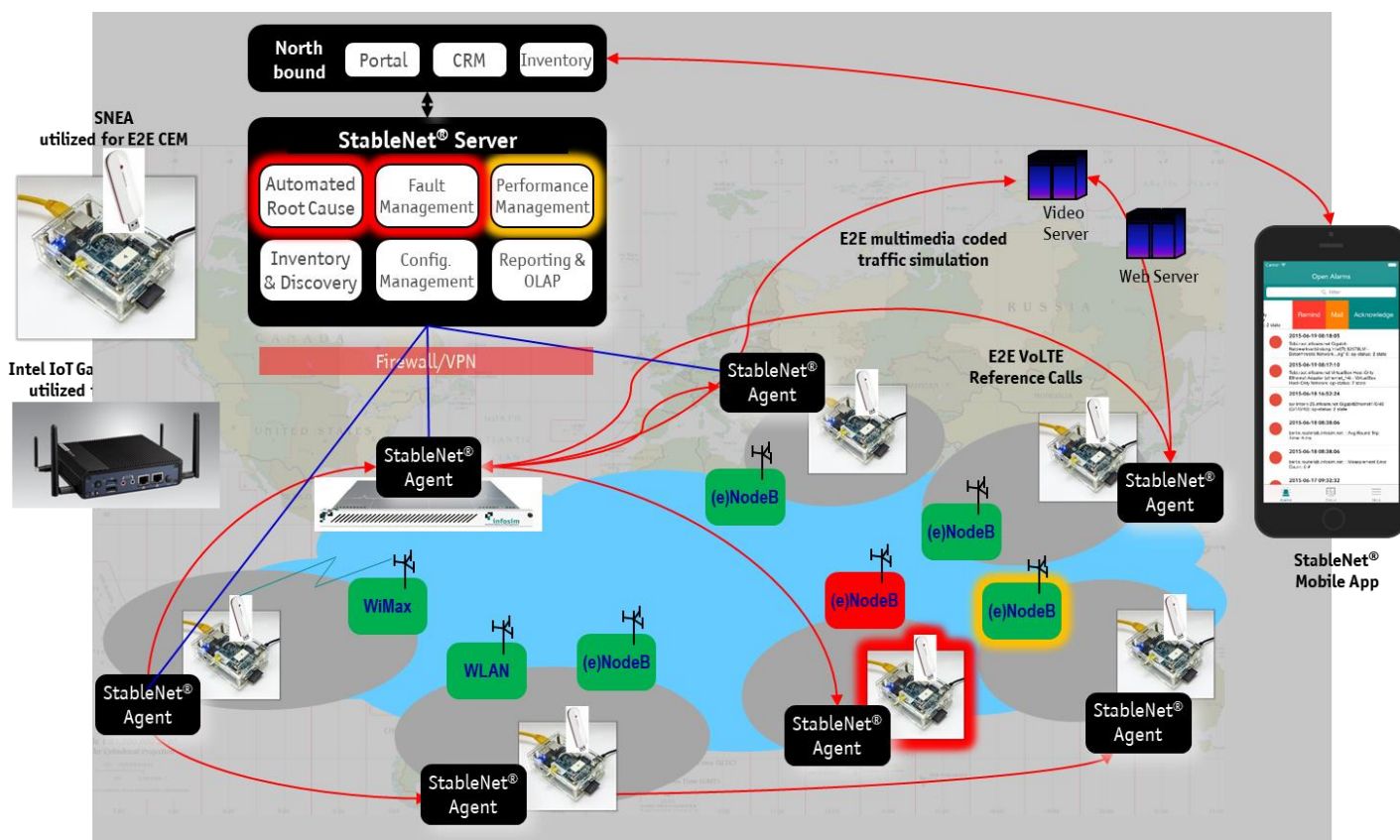
StableNet® can be flexible adapted by the user (admin) or Infosim partner to match with operations staff and client user requirements.



Mobile Services Reference Monitoring example

Distributed StableNet® Agents do allow services monitoring E2E e.g. Call / MoS Quality and reachability in between distributed agents.

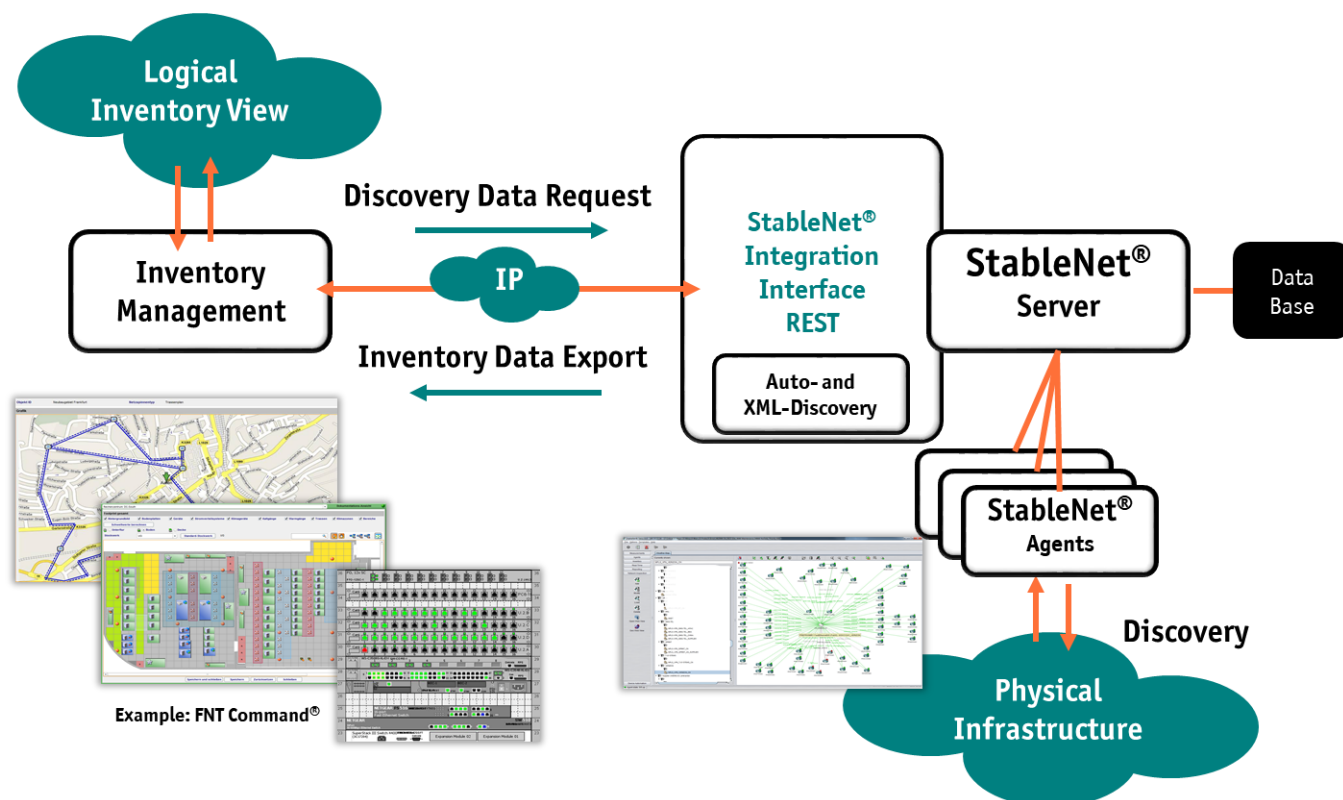
The utilization of even larger numbers of small StableNet® Agents do allow to deploy a cost efficient monitoring of services across your country services to check services coverage and availability in real time.



Tracking of Inventory roll-out and activation

We do usually interwork with Inventory Management systems here.

In the example below we do show the typical interworking solution with an ITAM solution e.g. in this example with FNT Command®.



Typical utilization of the integrated solution

- **Automated inventory updates:**
 - The integration enables the automated importing and updating of data on servers, routers, switches, load balancers, etc.
- **Simplify device assignments:**
 - These devices can be assigned in the ITAM to their respective zones (e.g. campus, building, floor, room, IT cabinet)
- **Automate device discovery:**
 - The StableNet® interface performs a cyclical, automated update of all relevant device data via a network scan (discovery)
- **Detect discrepancies between inventory and the „real world“:**
 - Feeding the data into the ITAM via a target/actual comparison makes it possible to resolve discrepancies between the “as is” physical network and the target infrastructure documented in the ITAM.

Field Monitoring

StableNet® Telco does allow to track alarms, device topologies, device location (e.g. on Open Street Maps) via its REST API based Mobile App.

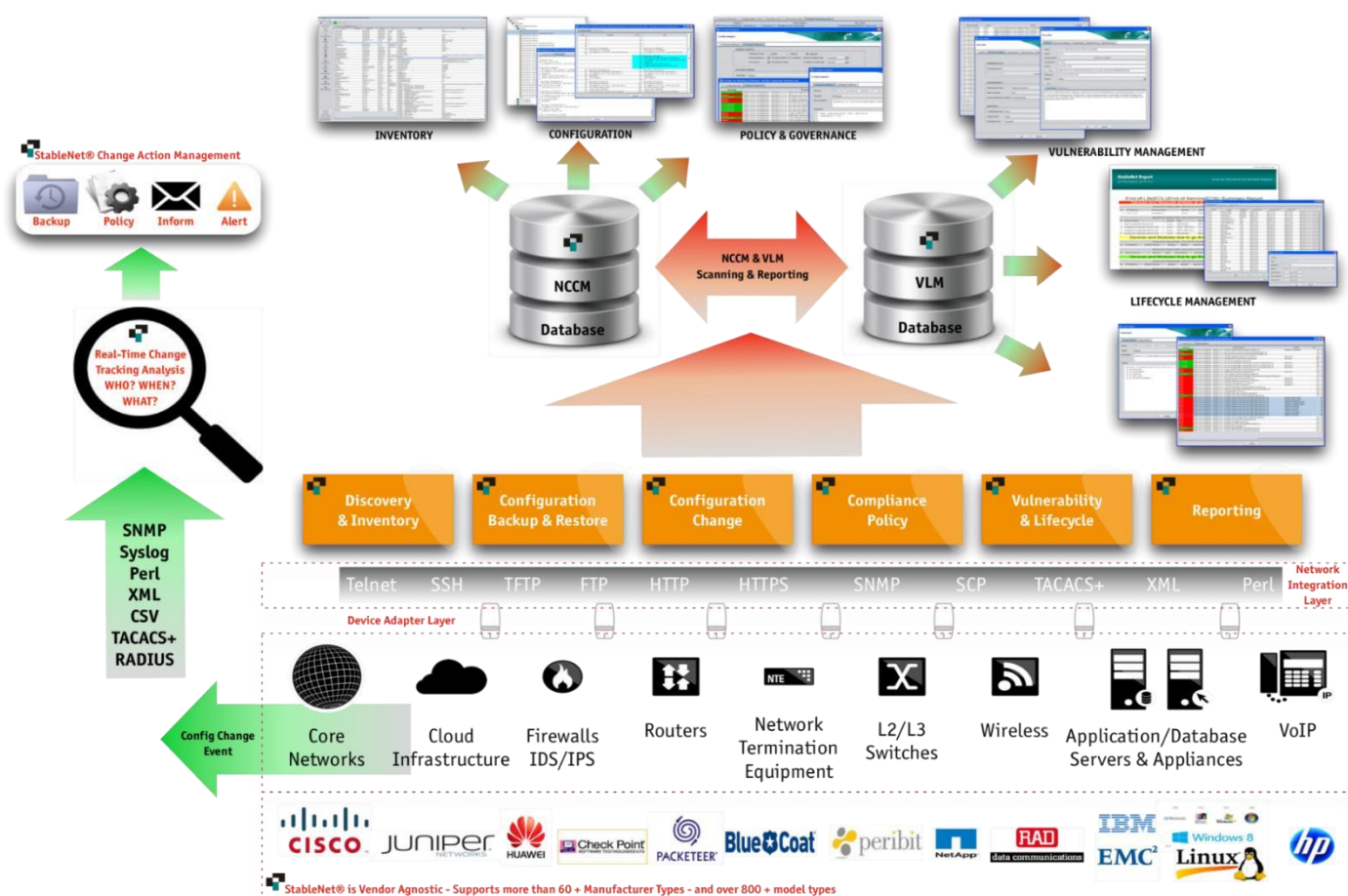
This does enable field technicians and field operation staff to track the status of services, infrastructure devices, device activation via the StableNet Mobile App from out in the field.



Network Configuration & Change Management

StableNet® does allow central and distributed automation the backup of device configurations. It can be also configured to run managed mass configurations of thousands of devices, incl. the support and interaction with provisioning systems e.g. to track if a service had been activated and to auto-start monitoring and reporting.

We do also offer a service to provide templates for automated Vulnerability checking or End of Live/End of Service checking & reporting for network devices.



Key StableNet® reference customers



About Infosim® StableNet®

StableNet® is available in two versions: Telco (for Telecom Operators, MSPs, ISPs and very large operations) and for Enterprises.

StableNet® Telco is a comprehensive unified management solution; offerings include: Quad-play, Mobile, High-speed Internet, VoIP (IPT, IPCC), and IPTV across Carrier Ethernet, Metro Ethernet, MPLS, L2/L3 VPNs, Multi-Customer VRFs, IoT industrial Gateways, Cloud and FTTx environments. IPv4 and IPv6 are fully supported.

StableNet® Enterprise is an advanced, unified and scalable network management solution for true End-to-End management of medium to large scale mission-critical IT supported networks with enriched dashboards and detailed service-views focused on both Network & Application services.

StableNet® is a 3rd generation highly automated, cross-vendor, cross-technology, cross-silo, Network & Services Management System. The key differentiation of StableNet® from legacy type Operational Support Systems (OSS) is that StableNet® is a Unified OSS system with three integrated functionalities that focus on Configuration, Fault and Performance Management, with Automated Root-Cause Analysis (RCA). StableNet® can be deployed on a Multi-Tenant, Multi-Customer or Dedicated Platform and can be operated in a highly dynamic flex-compute environment.

About Infosim[®]

Infosim[®] is a leading manufacturer of automated Service Fulfillment and Service Assurance solutions for Telcos, ISPs, Managed Service Providers and Corporations.

Infosim[®] develops and markets StableNet[®], the leading unified software solution for Fault, Performance and Configuration Management.

StableNet[®] is a single platform unified management solution designed to address today's many operational and technical challenges of managing distributed and mission-critical Telco, MSP and IT infrastructures.

Many leading organizations and Network Service Providers have selected StableNet[®] due to its enriched features and reduction in OPEX & CAPEX. Many of our customers are well-known global brands spanning all market sectors.

References are available on request.

At Infosim[®], we take pride in the engineering excellence of our high quality and high performance products. All products are available for a trial period and professional services for Proof-of-Concept (POC) can be provided on request.

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Your Infosim[®] & Infosim[®] Partner Contacts

Please feel free to contact us if you have any questions or need more information.

You can reach us at:

www.infosim.net

EMEA, Headquarters

Infosim GmbH & Co. KG
Landsteinerstraße 4,
97074 Würzburg,
Germany

Phone +49 931 20592 200
Email: info@infosim.net

AMERICAS

Infosim, Inc.
13809 Research Blvd.
Suite 802
Austin, TX 78750, USA

Phone: +1 512 792-4200
Email: info@infosim.net

APAC

Infosim Asia Pacific Pte Ltd.
8 Ubi Road 2
#08-04 Zervex
Singapore 408538

Phone: +65 6562 8286
Email: info@asia.infosim.net