Management and Provisioning Ecosystem

Service-oriented management, provisioning and orchestration

January 2016
Iskratel Group

Competent and credible global integrator of infocommunications solutions

- **70 years** of experience
- **30 locations** worldwide
- **900 employees**
- Customers in **50 countries**
- **EU-based** R&D and own manufacturing facilities

- We leverage our ICT expertise in delivering integrated solutions across **telco, transport, public safety** and **energy** industries.

Iskratel headquarters in Kranj, Slovenia, EU
**TELCO**

We enable the most favourable way to network modernisation with integrated and proven solutions, using our own and our partners' products.

**PUBLIC SAFETY**

We integrate our solutions, based on extremely reliable platforms, into all areas of public safety – within the communities and industry verticals.

**TRANSPORT**

We aim to become one of the leading solution providers of infocommunications and smart infrastructures, improving safety and efficiency with innovative and reliable solutions.

**ENERGY**

We empower mission-critical environments with solutions for operational communications and control systems – from day-to-day operations to emergency responses in critical situations.
Overview of SI3000 MNS Ecosystem
Main Functionality

Integrated management solution for Iskratel and 3rd-party network elements

Multi-user architecture

Mass operations and wizards

Alarm and performance monitoring

Northbound connectivity for OSS/BSS integration

Southbound connectivity for 3rd-party integration

Support for virtualization

High availability and geo-redundant operation
Building Blocks of SI3000 MNS Ecosystem

Management node system (MNS) 2.x
Network-element manager (NEM)
Element manager (EM)
Fault-monitoring system (FMS)
Open-device adapter / Fault-access module (ODA/FAM)
Performance- and quality-monitoring system (PQMS)
OpenMN northbound interface (NBI)
Basic Architecture

SI3000 MNS Ecosystem

OpenMN NBI (SOAP)

MNS 2.x

Network elements

OSS / BSS

EM

FMS

PQMS

ODA / FAM

NEM 1

NEM n

ODA / FAM 1

ODA / FAM n
Management Node System (MNS) 2.x

Top-level application with access to other applications
Centralised service modelling and provisioning
Mass operations for provisioning, assurance, inventory
OpenMN NBI for integration with OSS/BSS/applications
Network-Element Manager (NEM)

1:N provisioning and mass operations
Configuration storage for network elements (NEs)
Off-line NE preparation
GUI customisation
Supported SI2000/SI3000 NEs: cCS, CS, MG, BA, TDM
Element Manager (EM)

1:1 provisioning
NE-management independent on MNS
Configuration storage for network elements (NEs)
Java application
Supported SI3000 NEs: Lumia, Pono, Peso, AS, AA
Fault-Monitoring System (FMS)

IP connectivity and alarm monitoring
- For Iskratel SI3000 NEs and 3rd-party NEs

Alarm life-cycle support
- Alarm (un)acknowledgement
- Alarm (un)deletion, etc.

User views
- Monitoring authorisation

Alarm proxy (X.733)
- OSS/BSS integration
Performance- and Quality-Monitoring System (PQMS)

Support for voice services on cCS, CS, MG, TDM

Powerful reporting
- System and ad-hoc reports
- E-mail distribution

Threshold-based alarms
- Absolute, relative, trend

Real-time short-term observing

Open interface
- OSS/BSS integration
OpenMN Northbound Interface (NBI)

**SOAP interface**
- Methods for broadband and Lumia (BA, Ex, Lumia, Peso)
- Methods for communications core (CS, MG)

**Unified methods**
- Methods based on user identity (DN)
- For SI2000/SI3000/EWSD/Alcatel S12/AlsiTek
- Line measurement
- Suspend/resume subscriber services
- Methods for supplementary services
Overview of
SI3000 MNS 2.x
Components of MNS

North-bound interface (OpenMN)
- SOAP/REST for OSS/BSS integration
- Function set for service provisioning equivalent to GUI

Centralized management (GUI)
- Inventory management
- Service provisioning
- Assurance management
- Software management
- 3rd-party NE provisioning
Main Functions of MNS 2.x

Centralised service provisioning for SI3000 product portfolio

Support for Intelligent Service Access: service modelling with profiles

Mass operations for service provisioning, assurance and inventory

Rich set of OpenMN methods for easy integration with OSS/BSS and applications
Overview of Profile-Based Management
Intelligent Service Access

Service-specific parameters (VLAN, QoS, multicast, security, L2CP) bundled into service profile

Service template is a bundle of service profiles

Network-wide reusable service profiles
Service Provisioning with Profiles

Simple and flexible service provisioning

- Commercial services modelled with profiles
- Commercial service packages organized into templates
  - E.g. package "Triple play" → service template "Triple play"
    - Service profile "Internet 6M" for data/internet
    - Service profile "IPTV 150" for IP television
    - Service profile "VoIP" for VoIP service
- Service profiles or templates assigned to ports/users
- Service assignment/replacement in single step

Easy integration with OSS/BSS or CRM

- Top-down provisioning, no pre-provisioning required
Profile-Based Service Provisioning

- User/Port
  - DSL profile
  - Service profile 1
  - Service profile N
  - ... (ellipsis)
  - 1:1 VLAN profile
- Service-flow profile
- 1: N VLAN profile
- Security profile
- Multicast profile
- L2CP profile
Example: Service Profiles for Triple Play

Port 0/5 → DSL profile 14M_6dB

Service template for "Triple play"

- **Internet 6M**
  - VLAN (3900, pvid=3900)
  - Service-flow (1/32, <no limit>, match any/any)
  - Security (dynamic=20, static=2)

- **VoIP**
  - VLAN 3998
  - Service-flow 1/33, <no limit>, DSCP CS5

- **IPTV 150**
  - VLAN (3998, pvid=3998)
  - Service-flow 1/33, <no limit>, DSCP CS4, protocol UDP
  - Multicast (group limit=150)

- **TR-069**
  - VLAN 4001
  - Service-flow 1/33, DSCP CS6

- **IGMP**
  - VLAN 3999
  - Service-flow 1/33, DSCP CS6, in protocol IGMP

- **IPTV-STB**
  - VLAN 3999
  - Service-flow 1/33, DSCP CS3
Benefits

**OPEX reduction**
- Centralised service provisioning
- Easy mass deployment
- Automatisation of service provisioning via OpenMN

**New sources of revenue**
- Portal applications using OpenMN API for topology, inventory, service provisioning
  - Service-oriented methods
  - Self-care portals
  - Cloud service integration
Benefits for Operators

- Zero-touch configuration for Lumia (ACS)
- Comprehensive user authentication and authorization
- Vertical integrability and horizontal scalability
- High availability with N-node cluster
- High resiliency with geo-redundant solution
- Evolution of MNS 1.x
Advanced Use Cases

**Time-based services**
- For residents and business customers
- Daily time plan, "turbo button"

**Business services**
- For SOHO and SME
- Cloud backup, bandwidth on demand

**Open broadband access**
- For network providers and municipalities
- Free choice of services and providers
Efficient OSS/BSS Integration

Lower OPEX with automated actions triggered from customer-care portal

For operators with established OSS/BSS environment
Manage SIP Subscriber on Broadband

Lower OPEX due to efficient provisioning of SIP subscriber on broadband and softswitch (SIP account + service profile)

For operators with TDM/NGN and centralised MNS
Time-Based Services

**New services** based on time (hour of day or day in week)
- New revenue from time-based services

For incumbent and alternative operators
Cloud Backup Service

Change service bandwidth for cloud backup, restore when finished

- New revenue from OTT-based services

For incumbent and alternative operators
Broadband Business Connectivity

Business connectivity for SMB and SOHO

- Real-time service monitoring (act before complaint)
- Daily SLA reporting
- No (CLI) config errors

For service operators focused on business customers
Open Access for any service to any subscriber

- Better network utilization
- Higher take-up rate and shorter ROI

For municipalities investing in FTTx, cable operators, utility companies
MNS in the Cloud

Rent MNS 2.x resources utilising L2 VPN between Iskratel and customer
- Shorter ROI – Pay as you grow
- Lower OPEX – No need for IT maintenance

For municipalities, alternative operators, utility companies
Overview of MNS 2.x Packages
Supported Hardware

Entry-level desktop (ELD)
- 1× dual-core, 2 GB RAM, HD min. 1× 80 GB S-ATA

Entry-level server (ELS)
- 1× quad core, 8GB RAM, HD min. 2× 500 GB S-ATA

Rack-mounted server (RMS) / Blade server (BLS)
- 2× quad core, 16GB RAM, HD min. 2× 300 GB SAS

Virtualisation platforms
- Increased flexibility, serviceability, HW reuse
- KVM virtualisation supported out-of-the-box
Functional Packages of MNS 2.x

**Light MNS**
(Basic maintenance)

**HW and SW**
- MNS HW
- SI3000 MNS 2.x
- SI3000 FMS
- Pre-installation of Linux OS
- Optional: SI3000 SPAG for Pono

**Licenses**
- MNS SW license
- MNS NE license (Basic maintenance)
- FMS NE license
- Optional: Additional MNS client license
- Optional: Additional FMS client license

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**Standard MNS**
(Service provisioning)

**HW and SW**
- MNS HW
- SI3000 MNS 2.x
- SI3000 FMS
- Pre-installation of Linux OS
- Optional: SI3000 SPAG for Pono

**Licenses**
- MNS SW license
- MNS NE license (Basic maintenance)
- MNS port/ONT license (Service provisioning)
- FMS NE license
- Optional: Additional MNS client license
- Optional: Additional FMS client license

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**Advanced MNS**
(Service provisioning with OpenMN & HA)

**HW and SW**
- MNS HW
- SI3000 MNS 2.x and OpenMN
- SI3000 FMS
- High availability
- Pre-installation of Linux OS
- Optional: Geo-redundancy
- Optional: SI3000 SPAG for Pono

**Licenses**
- MNS and OpenMN SW licenses
- MNS and OpenMN NE licenses
- MNS and OpenMN port/ONT licenses
- FMS SW and NE licenses
- Optional: Additional MNS client license
- Optional: Additional FMS client license
- Optional: Additional N-node license (more than 2 nodes)
Capacity Packages of MNS 2.x

<table>
<thead>
<tr>
<th>Standard configuration</th>
<th>Max. ports/ONT</th>
<th>Max. NE</th>
<th>HW</th>
<th>HA</th>
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<tbody>
<tr>
<td>MNS 2.0 – Small</td>
<td>10,000</td>
<td>400</td>
<td>ELD</td>
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<td>MNS 2.0 - Medium</td>
<td>50,000</td>
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<td>ELS/ELS-1U</td>
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<td>MNS 2.0 - Large</td>
<td>100,000</td>
<td>4,000</td>
<td>RMS</td>
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<tr>
<td>MNS 2.0 – High-end</td>
<td>&gt; 100,000</td>
<td>&gt; 4,000</td>
<td>RMS/BLS</td>
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**High-end MNS (project based)**
- Blade server
- Up to 1,000,000 subscribers and up to 40,000 NE
- N-node cluster
- High-availability

**Large MNS**
- 2 RMS (1U)
- Up to 100,000 ports and up to 4,000 NE
- HA mode
- Optional: Geo-redundancy

**Medium MNS**
- ELS (tower or 1U)
- Up to 50,000 ports and up to 2,000 NE
- HA mode
- Optional: Geo-redundancy

**Small MNS**
- ELD (Desktop PC)
- Up to 10,000 ports and up to 400 NE
## Proposed Configurations of MNS 2.x

<table>
<thead>
<tr>
<th>Capacity (ports)</th>
<th>Small (10k)</th>
<th>Medium (50k)</th>
<th>Large (100k)</th>
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<table>
<thead>
<tr>
<th>Functionality</th>
<th>Light MNS</th>
<th>Standard MNS</th>
<th>Advanced MNS*</th>
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<tr>
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</tbody>
</table>

* RMS is required for HA mode
** Only OpenMN
Overview of Sl3000 FMS
Fault-Monitoring System (FMS)

IP connectivity and alarm monitoring
- For Iskratel SI3000 NE and 3rd-party NE

Alarm life-cycle support
- Alarm (un)acknowledgement
- Alarm (un)deletion, etc.

User views
- Enable monitoring authorisation

Alarm proxy (X.733)
- OSS/BSS integration
SI3000 FMS – Fault-Monitoring System

Centralised alarm-monitoring system
  – Part of Iskratel SI3000 MNS ecosystem
  – Shipped as standard required functionality

SI3000 FMS as generic product
  – Top-level MN application which provides alarm view and access to all Iskratel management applications

SI3000 FMS with professional services
  – Basis for alarm-centralisation projects
  – Support for 3rd party NE
FMS Screenshot
Main Features of SI3000 FMS

- NE IP-connectivity status and alarm monitoring
- Central alarm life-cycle support
- Graphical presentation of monitored network
- Reliable alarm presentation (resynchronization)
- Different user rights (user views)
- Notification of important events (e-mail, alarm panel)
- Integration with OSS/BSS systems using SNMP proxy
- Hierarchical alarm aggregation from regional servers (cascade)
Benefits for Customers

Light OSS system

– Centralised overview of network health
– Alarm life-cycle support (acknowledgement, clearing...)
– Powerful filtering (presentation filters and I/O filtering)
– Support for generic SNMP monitoring

Unified user experience

– Uniform presentation of alarms (different NE types, including 3rd-party)
– Context start of other management applications (NEM, EM)
– Topology maps
Benefits for Customers (cont'd)

User views

– Customised presentation of NEs and network topology
– Different user rights
– Suitable for multitenant networks

Easy integration with external OSS/BSS systems

– X.733 compliant alarm model
– Lower costs for OSS/BSS licenses
  • Only one connection point for all included NE types
  • Only one type of integration needed

High performance

– Up to 16,000 NEs
– Up to 60 concurrent users
Monitoring Features

IP connectivity status monitoring
- ICMP and/or SNMP polling

SNMP-based alarm supervision
- Full support for Iskratel SI2000 and SI3000 portfolio
- Integration of 3rd-party NEs
- Polling and trap-based alarm supervision
Alarms

Reliable alarm information on FMS
- Synchronisation of alarm statuses from NE
- Automatic, manual and periodical resynchronisation

Central alarm life-cycle support
- Manual alarm (un-)acknowledgement and (un)clearing
- Optional user-supplied comment
Inventory

Use of MNS inventory
- Periodical synchronisation of NEs and containers
- From central MNS inventory or multiple MNS domains

Auto discovery of IP network
- Protocols used: ICMP or/and SNMP
- Discovery modes: levels / IP range / use of SNMP
- Activation: manual and periodical

Manual insertion of NEs on GUI
User Views and Security

Role-based security

- User roles: administrator, operator, guest

User views define the accessibility scope

- Arbitrary hierarchical topologies of sub-maps
- Background graphics for sub-maps (jpeg, gif, png)
Functional Interfaces

Optional actions
- SMTP e-mail support
- Command-line actions on particular alarms

Alarm panel
- Remote connection at client side using serial port
- Bound to the selected user view

Audible alarming

Save to file and print
Integrated Tools

**Generic built-in tools**
- Ping console
- SNMP console
- Traceroute console
- Network-interfaces window
- Host-resources window
- Simple MIB browser

**Context-sensitive start of management applications**
Monitoring of System Resources

SNMP-based resource control
- CPU, RAM, disk space, network utilisation

Graphical presentation of SNMP counters

Alarming
- In case of exceeded thresholds on SNMP resources
Alarm Filtering

**Presentation filters**
- GUI for filter administration
- Basic and advanced filters
- Save and load filters

**Processing filters**
- Input filters (input of platform)
- Output filters (for OSS connectivity and cascading)
- GUI for filter administration
Ergonomics

Links
- Between tree view, map view and alarm lists

GUI flexibility
- User-defined selection and order of table columns

Searching for NE
- Different criteria, including user-defined tagging

User preferences
- Adjustable colours; frequency and duration of alarm sound
Deployment

Run-time environment

- Server side on Linux OS (CentOS)
- Java-based client side, zero client installation
- High availability (active/stand-by cluster operation)

Biggest reference

- 16,000 SNMP agents, 40 clients, max. 80 traps/sec
- Works in cluster mode
Management and Provisioning Ecosystem

Service-oriented management, provisioning and orchestration

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