



ElettraSuite BS Node

The versatile network element of the ElettraSuite ADAPTANET® TETRA IP solution by SELEX Communications

tetra solutions

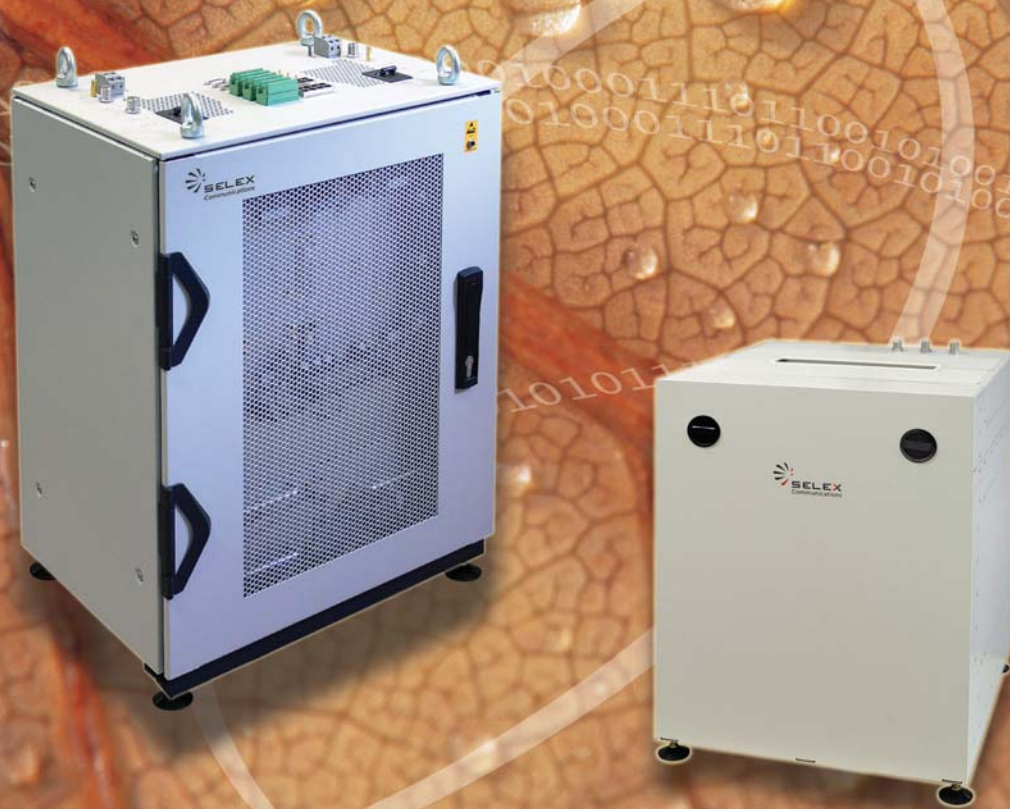


network elements

ADAPTANET®
IP solution

ELETTRA
SUITE

 **SELEX**
Communications
A Finmeccanica Company



EletraSuite BS Node

The versatile network element of the EletraSuite ADAPTANET® TETRA IP solution

A NEW BENCHMARK IN DISTRIBUTED ARCHITECTURE

A distributed architecture is a very cost-effective solution to link a number of sites and represents a real benefit for end users in term of easiness of installation, configuration and management activities.

The new SELEX Communications ADAPTANET® network solution emphasises these characteristics. The EletraSuite ADAPTANET BS Node family sets a new benchmark in distributed architecture devices.

Product description

The **EletraSuite BS Node** is the core of the ADAPTANET® network. It can work either as a high performance TETRA *Radio Base Station (BS Node)* or embedding a full-featured *TETRA Switching device (BS Node-TS)*.

MAIN FEATURES

Fast Deployment

Thanks to its pre-loaded default configuration, *BS Node* can be quickly deployed on field and start working immediately. The default configuration file contains a set of main parameters, which can be easily modified by the operator after the start-up.

Plug & Play

All *BS Node* family devices are ready to work by switching on immediately after delivery.

Connectivity

IP connectivity

BS Node and *BS Node-TS* can be directly connected to an IP backbone via Ethernet links, such as all other ADAPTANET® solution devices (gateways, dispatchers, recorders). These connections may also feature redundancy both on equipment and line sides.

E1 connectivity

BS Node provides also 2 Mbit/s interfaces (ITU-T G.703/G.704 compliant), which may be dual-redundant both on equipment and line sides. The *BS Node* with E1 connectivity supports the drop-insert capability for *BS Nodes*.

Redundancy

The *BS Node* is specifically designed in order to support a high level of performance on a 24-hour-a-day basis, even in case of failure of some of the internal modules. The high level of fault tolerance reflects:

- Modular architecture of internal equipment;
- Redundancy of major modules and main power supply;
- Capability of self-reconfiguration in the event of failures;
- Redundancy of links towards other network elements, with the autonomous capability of switching to one of them when the other fails;
- Capability of automatically activated fallback mode (when configured as a *BS Node* only) in order to allow its functionality within the coverage area.

Monitoring

The *BS Node* has been also designed to provide a full set of monitoring features:

- Status monitoring and fault management of internal modules;
- Alarms report;
- Events and alarms log;
- Capability to collect site alarms and to drive actuators;
- Local maintenance and configuration operations;
- Diagnostic testing activities, using specially developed tools, to identify potential anomalies within the equipment.

Future-Proof

BS Node can be equipped with **TEDS carriers**, exploiting all the benefits of the **new TETRA Release 2** standard, with one of the highest real output powers at the antenna connector. TEDS transceivers can also be added at a later date, after site installation. This offers an excellent money-saving benefit for customers.

CONFIGURATIONS

BS Node is available in four different configurations:

- **BS Node:** a full-services Base Station housed in a standard rack (up to 4 carriers)
- **BS Node C:** a full-services Base Station and it housed in a compact rack (up to 2 carriers)
- **BS Node-TS:** a full-services Base Station including a complete TETRA Switching Node and housed in a standard rack (up to 4 carriers)
- **BS Node C-TS:** a full-services Base Station including a complete TETRA Switching Node and housed in a compact rack (up to 2 carriers).



ElettraSuite BS Node



ElettraSuite BS Node C

Network topologies

The ADAPTANET® Network solution based on *BS Node* gives end-users the ability to easily adapt the network to any coverage and operational requirements, flexibly choosing between two main Network Topologies: **Multi-cluster** and **Peer-to-Peer**. The storage of subscribers' database (HLR) is up to the mandatory add-on **Service Management Node (SMN)**.

MULTI-CLUSTER

Multi-cluster Network Topology is the ideal choice if the coverage is required for a limited set of interconnected areas that don't require uniform global coverage (e.g., networks interconnecting airports, or oil plants, etc). The dedicated network providing coverage to a single area is called cluster. A single cluster is composed of 1 BS Node-TS and up to 4 BS Nodes for each BS Node-TS.

It is possible to expand a cluster by adding a set of other ElettraSuite ADAPTANET® network elements, such as gateways, dispatchers and Network Management System, according to BS Node-TS capacity.

If needed, it is possible to connect several clusters for modular expansion of the network.

PEER-TO-PEER

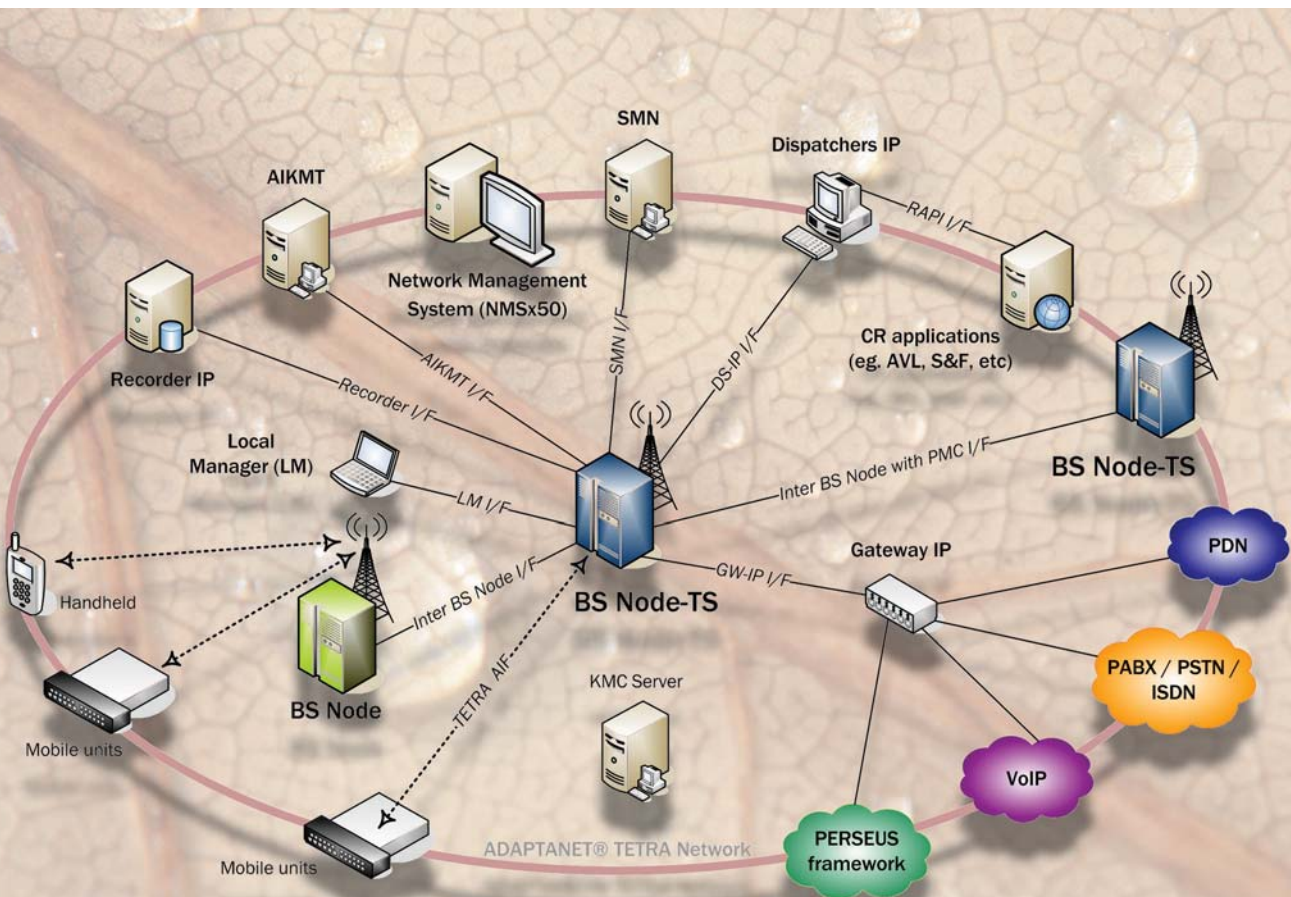
If a more extensive network is required, Peer-to-Peer architecture is the ideal solution, supporting a high number of users in a single network with a large number of Network Elements, and providing a full Disaster Recovery capability.

TECHNICAL CHARACTERISTICS

Composition

The *BS Node* and the *BS Node-TS* are based on the following main modules:

- *SIU (Switch Interface Unit)*, a standard Ethernet Switching device providing external and internal connectivity;
- *SCBB (Site Controller & Base Band)*, which provides site controller functionalities;
- *RFU (TETRA Radio Transceiver)*, which realises the radio sub-system, and PSU (Power Supply Unit), which provides the RFU modules the suitable power supply. Each RFU is related to its own PSU.
- The *External Interconnection Panel* provides the management sub-rack for outer connection: breaker, power supply filters, output connectors.
- The ON/OFF Alarm and Network Interfacing Module (IFCTRL) performs the network link redundancy and alarm management.
- The *Fan Module* provides the forced cooling of the air inside the cabinet.
- The *Antenna Distribution System* is composed of all the units that connect the transceiver unit to the antenna system (Combiner, Duplexer, Multicoupler, RX Filter, VSWR alarm unit).



The *BS Node-TS* is also equipped with:

- *PMC (PCI Mezzanine Card)*, which performs switching services and provides the following main TETRA applications and services and IP services capabilities.
 - TETRA Application Server Function
 - Resource Management
 - Packet Data
 - Mobility Management
 - Short Data Services (SDS)
 - Authentication Centre Facility for secure storage of secret authentication (AIKM)
 - IP transfer functions (for example, IP routing).

Service Management Node (SMN)

A single **Service Management Node** is required in each ElettraSuite IP ADAPTANET® network. Its main functions are:

- Storing the HLR database for the entire ADAPTANET® network
- Providing Area Name Service functions to support NMS connectivity
- Running the BS Mediation Device necessary for the management of all BS Nodes
- Running Network Time Protocol (NTP) Server to distribute time-stamp to the overall network

- Running TETRA Module Handler (to ensure applications' reliability)
- Providing BS Mediation Device (allowing BS Nodes management by means of Local Manager).

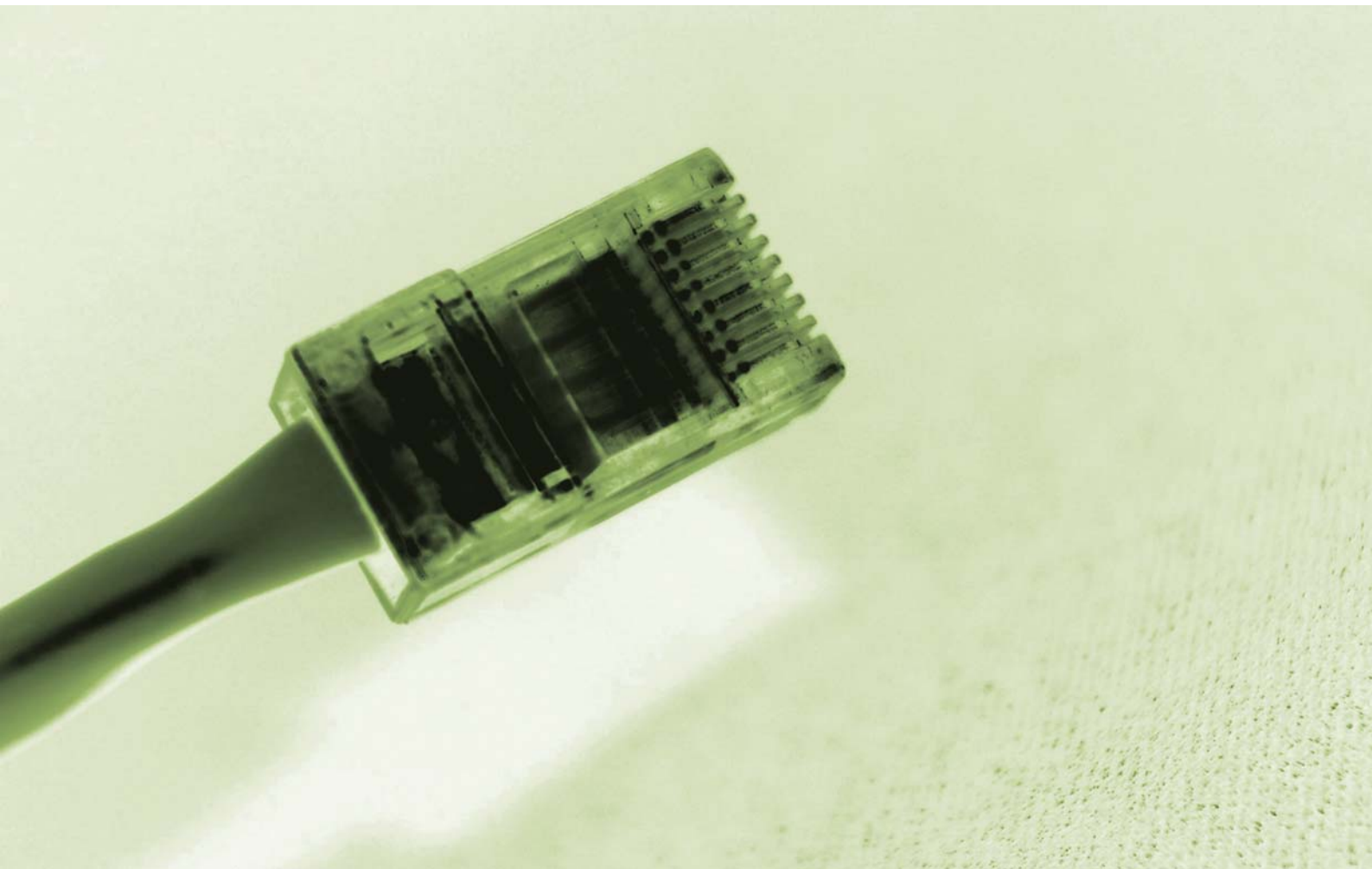
Service Management Node is also involved in the Authentication TETRA security feature.

The unique HLR stores all VPNs, HLR operators and subscribers of the whole network, allowing full performances of Subscriber Management activities.

Service Management Node hosts Call Log and Performance Management Server and traces in real time the activity of both individuals and groups. BS Local Terminal and BS Local Manager Subscriber Management GUI provide the SMN the possibility to manage all the logical and physical resources of the network, such as:

- Location areas
- Site controllers
- Cells and transceivers
- Foreign cells
- Links and cards
- LAN switches and routers

Synchronization can be performed also by external sources. Duplicating LAN ports and Hard Disk guarantee a full SMN redundancy.



How can I order my base station?

Thanks to the versatility of the Base Station Node, you can order the configuration best suited to your future network. Below, you can find a fast guideline how to order the exact model of base station that you want. For example, you want a *BSN400L/4* or *BSN430M/3-E1-R-T* or *BSN470H/2-C-TS-GPS-TEA2-R-2D*.

Code meaning: **BSN***ab/c-d-e-f-g-h-i-j-k*

- BSN = fixed part
- ab/c = mandatory part (operating frequency band and q.ty of RFU definition)
- d-e-f-g-h-i-j-k = optional part (code to be added to include the related features)

Frequencies

Code		a				
Value		350	400	430	470	800
b	Operating band def.	350 to 380 MHz	380 to 400 MHz	410 to 430 MHz	450 to 470 MHz	806 to 870 MHz
	L Low Sub-Band (MHz)	RX: 351 to 358 (*) TX: 361 to 368	RX: 380 to 385 TX: 390 to 395	RX: 410 to 415 (*) TX: 420 to 425	RX: 450 to 455 TX: 460 to 465	RX: 806 to 825 (*) TX: 851 to 870
	M Middle Sub-Band (MHz)	---	---	RX: 412 to 417 TX: 422 to 427	---	---
	H High Sub-Band (MHz)	---	RX: 385 to 390 (*) TX: 395 to 400	RX: 415 to 420 (*) TX: 425 to 430	RX: 455 to 460 TX: 465 to 470	---

Note: (*) = available upon request

Radio Transceiver(s)

Code	Value	Description
c	1	1 (one) RFU ⁽¹⁾
	2	2 (two) RFU
	3	3 (three) RFU ^(1, 2)
	4	4 (four) RFU ⁽²⁾

Note: (1) = not applicable to Bi-cell configuration
(2) = not applicable to Compact version

ADD-ON

Rack version(s)

Code	Value	Description
d	-	Standard version (21U rack)
	C	Compact version

Telephony server (TS)

Code	Value	Description
e	-	Not equipped with PMC module
	TS	Equipped with PMC module

External interface

Code	Value	Description
f	-	LAN Ethernet 100/1000 (IP)
	E1	E1 ITU-T G.703/G.704 (TDM) (*)

Note: (*) = not applicable in case of TS add-on

GPS module add-on

Code	Value	Description
g	-	Not equipped with GPS module
	GPS	Equipped with GPS module (*)

Note: (*) = not applicable to E1 External I/F configuration

Air-Interface Encryption

Code	Value	Description
h	-	No Encryption
	TEA 1	Encryption Kit - TEA1 code
	TEA 2	Encryption Kit - TEA2 code
	TEA 3	Encryption Kit - TEA3 code

Redundant configuration

Code	Value	Description
i	-	Not redundant configuration
	R	Redundant configuration (*)

Note: (*) = duplication of SCBB, IF-CTRL, SIU, PMC (if present) and Encryption kit (if present) modules. RFU redundancy not included in this code.

Branching configuration

Code	Value	Description
j	-	Mono-cell - standard configuration
	T	Mono-cell / Tri-sector configuration ⁽¹⁾
	B	Bi-cell configuration ^(1, 2)

Note: (1) = not applicable to Compact version
(2) = only 2 (1+1) and 4 (2+2) TRX are applicable

Receiver diversity configuration

Code	Value	Description
k	-	No Diversity
	2D	2-way Diversity ⁽¹⁾
	3D	3-way Diversity ^(1, 2)

Note: (1) = not applicable to Tri-sector configuration
(2) = not applicable to Bi-cell configuration

Examples:

BSN400L/4
ab RX: 380 to 385 MHz / TX: 390 to 395 MHz operating band
c Equipped with 4 RFU
d Standard version
e Not equipped with Telephony Server
f SIU (LAN interface)
g not equipped with GPS module
h No Encryption
i Not redundant configuration
j Mono-cell configuration
k No diversity

BSN470H/2-C-TS-GPS-TEA2-R-2D
ab RX: 455 to 460 MHz / TX: 465 to 470 MHz operating band
c Equipped with 2 RFU
d Compact version
e Equipped with Telephony Server
f SIU (LAN interface)
g equipped with GPS module
h Equipped with TEA2 Encryption kit
i Redundant configuration
j Mono-cell configuration
k 2-way diversity configuration



TECHNICAL DATA

BS Node and BS Node-TS

Output power:	
- <u>TETRA</u> :	• 44 dBm nominal per carrier, according to ETSI EN 300 392-2 power class 2 for TETRA Carriers
- <u>TEDS</u> :	• 40 dBm nominal per carrier, according to ETSI EN 300 392-2 power class 2 for TEDS Carriers, • 40 dBm nominal per carrier, according to ETSI EN 300 392-2 power class 4 for TEDS Carriers operating in 806 to 870 MHz frequency band
Receiver Class:	A
Static Sensitivity:	• Static Sensitivity: -117 dBm minimum guaranteed, TCH 7,2 channels for TETRA carriers including antenna distribution system losses. • ETSI EN 300 392-2 Reference Sensitivity (including antenna distribution system losses) for carriers operating in 806-870MHz frequency band.
Dynamic Sensitivity:	• -113.5 dBm for TETRA carriers @ LNA input • -108 dBm minimum guaranteed for TETRA carriers including antenna distribution system losses • Minimum Reference dynamic Sensitivity, as prescribed in ETSI ETS 300-392-2 for TEDS carriers and 800 MHz carriers
Diversity:	Three configurations: 3 ways diversity, two ways diversity and no diversity
Frequency band (MHz):	380 to 400 / 410 to 430 / 450 to 470 / 806 to 870 (available on request)
Power Supply:	• -48V DC (standard and compact version) • 220V AC (compact version, as option)
Environmental aspects:	• Operating: ETSI ETS 300 019-1-3, class 3.1E (-10 °C +45 °C) • Storage: ETSI ETS 300 019-1-1, class 1.2 • Transport: ETSI ETS 300 019-1-2, class 2.2 • EMC: ETSI EN 301 489-18
Power Consumption:	• 750W (2 carriers, fully redundant transmitter operating conditions typical)
Interfaces:	• Networking: - 1+1 LAN ports 100/1000 Mb for backbone connectivity and supporting port fail-over functionality - 2 LAN ports 100/1000 Mb (one per SIU) for local connection towards other NE • Control: - 24 Dry Contacts to collect external alarms (as inputs). - 8 Dry Contacts to drive external actuators (as outputs).
Mechanical features cabinet (21U):	Size (HxWxD): 120 x 60 x 40 cm / Weight: 160 kg (maximum configuration)
Mechanical features "compact" cabinet:	Size (HxWxD): 58 x 44 x 48 cm (can be housed into a 19" standard rack) / Weight: 65 Kg (maximum configuration)

Service Management Node (SMN)

Platform:	Standard Mini-Tower PC (rack mounted upon request)
Power supply:	100-240 VAC, 50-60Hz
Operating system:	Windows XP PRO SP3 with XP Media English version; Oracle 10 as RDBMS

