

Priedas Nr. 8.3 – Tinklo valdymo sistemos techninių charakteristikų reikalavimai / Annex No. 8.3 - Technical characteristic requirements for network management/monitoring system.

Lentelė Nr. 1 Tinklo valdymo sistemos techninė specifikacija / Table No. 1 Network Management System Technical Specification

Eil. Nr. / No.	Technical parameters for parts provided in technical specification		Siūlomų prekių techniniai parametrai ir kiti duomenys / Specifications and other details for suggested parts	Pasiūlymo dokumentai patvirtinantys siūlomos prekės techninius parametrus / Documents which confirms technical specifications of suggested part	
				Dokumento pavadinimas / Document name	Pasiūlymo lapo numeris arba nuoroda į gamintojo tinklalapį / Offer sheet number or reference to manufacturer's page
	Indicator	Requirement	Nurodo Tiekėjas: / Provided by supplier:		
1.	Tinklo valdymo sistema (toliau - NMS) / Network Management System (NMS)				
1.1	Software manufacturer, model, modification	It is necessary to list the NMS components of all the proposed software, their quantities, models, manufacturer and product codes.  <i>Note: The proposal must be accompanied by a detailed list of the elements / modules used for each NMS, including OS and DB licenses planned to be used (Bill of Material - BOM).</i>	1) LightSoft (NMS) Network management system 2) EMS-APT (Neptune) Element management system 3) LightInsight - Analytics and reports 4) SNMP GW - NBI 5) GEN-EMS	*BOM	Please refer BOM Management part
1.2	Description of system functionality	The NMS must provide continuous control / monitoring of network nodes.		*End-to-End Management Suite General Description	
1.3	The working medium of the system	Virtual Customer's infrastructure. VMware ESXi 6.5 and higher must be supported		*LightSoft V14 Release Notes Rev. 13 * LightSoft V15 Release Notes	Please refer LightSoft V14.91 Release notes Page 43 Please refer LightSoft V15.1 Release notes Page 12
1.4	Composition of kit	One set includes software for managing and monitoring network objects, i.e. software modules and components to meet requirements specified in technical specification must be included in the kit. NMS modules and components must be from the same manufacturer to ensure seamless integration. Applicable exceptions are specified elsewhere in the Annex to these requirements.		*End-to-End Management Suite General Description	
1.5	Number of controlled equipment	The NMS must ensure the management of all network equipment installed within the scope of the relevant part of the procurement object (P.P.O.) in accordance with the requirements below, with a margin of 20% in case of expansion.		*End-to-End Management Suite General Description *BOM	
1.6	Device compatability	NMS must support all network equipment within scope of this part of procurement, and equipment must be included in the list of fully supported devices by NMS manufacturer, if such list is publicly available.		*LightSoft V14 Release Notes Rev. 13 * LightSoft V15 Release Notes	Please refer LightSoft V14.91 Release notes Page 43 Please refer LightSoft V15.1 Release notes Page 12

1.7	Modules of the kit	<p>NMS must be dedicated to managing and monitoring IT infrastructure through the following modules:</p> <ul style="list-style-type: none"> <li>- Network failure management;</li> <li>- Network configuration management;</li> <li>- Network performance management;</li> <li>- Log management.</li> </ul> <p>All modules must be integrated with each other and accessed through the main control system control interface.</p>		*End-to-End Management Suite General Description	All document
1.8	Installation	<p>Network management / monitoring system must be deployed on Customer's virtual infrastructure.-The Supplier shall provide all other licenses for operating systems and databases provided separately from the system. These licenses must be evaluated into separate lines in the offer.</p>		<p>* BOM</p> <p>* VMware Prerequisites Technical Note</p> <p>* Packet Optical Network Management Products on Linux Technical Note</p>	Please refer Prerequisites Technical Notes
1.9	Multi-user functionality	<p>Proposed network management solution must support at least 10 connected users at the same time.</p>		<p>* BOM</p> <p>* VMware Prerequisites Technical Note</p> <p>* Packet Optical Network Management Products on Linux Technical Note</p>	Please refer 10 users included in BOM
1.10	Settings templates	<p>System functionality must ensure creation of templates for monitoring main network resources, devices, parameters. Default templates for different types of devices need to be based on best practices for fast out-of-box automated deployment.</p>		*End-to-End Management Suite General Description	Please refer End-to-End Management Suite General Description69-73
1.11	Rendering	<p>NMS provides a comprehensive view of network elements and connections. NMS must ensure network elements and connections are included in the visual / graphical domain map. In visual maps, elements and joints are presented in different colors depending on their state.</p>		*End-to-End Management Suite General Description	Please refer End-to-End Management Suite General Description Page 32-35 (Paragraph 2)

1.12	Backups	The NMS must provide a system-level backup mechanism for manually and automatically backing up NMS data.		* Technical Solution Design	Please refer Technical solution Design Page 51 (Paragraph 4.1.4)
1.13	Visualization	NMS provides a visual representation of network element status and alarms. It also provides a complete map of network domain with icons of the appropriate color.		*End-to-End Management Suite General Description	Please refer End-to-End Management Suite General Description Page 32-35 (Paragraph 2)
1.14	Reports	The NMS must ensure the following reporting, with the ability to customize or create new report templates: -Inventory; -Availability; -Performance; -Events; -System Status; -Node condition; -Ports status; -Etc.		*End to End management Suite description	All document
1.15	Reporting periodicity	NMS must ensure reporting at the following intervals: -1 hour; -1 day; -1 week; -1 month; - For manually set periods.		*LightInsight General description	All document
1.16	Report format	Reports must be submitted in one of the following formats: PDF, HTML, CSV, XML.		*LightInsight General description	LightInsight General description Page 4
1.17	Warning actions	NMS must provide the following configurable actions: -Sending of e-mail; -Log the alert/event/warning message to a file; -Reporting alert to the system event log; -SNMP Trap message sending or JMS, Kafka events; -Syslog message sending.	Comply	* End-to-End Management Suite General Description * Apollo general description	<ol style="list-style-type: none"> <li>1. (Sending of e-mail) Please see End to End managmnet suite paragraph 4 (Page 90) - Automatic alarm forwarding to email, SMS, or FTP.</li> <li>2. (Audio alert) Please see End to End managmnet suite paragraph 4 (Page 90) - Customizable counters, audio signals, and pop-ups.</li> <li>3. (Log the alert/event/warning message to a file) Please see End to End managmnet suite paragraph 4 (Page 90) - Complete logging of all alarms and events . Please see End to End managmnet suite paragraph 4.8 (Page 104)</li> <li>4. (Reporting alert to the system event log)Please see End to End managmnet suite paragraph 4.1.3 (Page 95) .</li> <li>5. (SNMP Trap message sending) Please see End to End managmnet suite paragraph 12.2 (Page 287,288) - SNMP GW.</li> <li>6. The Syslog protocol - Please refer Neptune general description Page 443</li> </ol>

1.18	Network Discovery	NMS must provide discovery and inventory of all network equipment installed within the scope of the relevant part of the procurement object (P.P.O.), as well as display connectivity with visibility of individual physical ports.	Comply	* End-to-End Management Suite General Description * Neptune general description	Please see End to End management Suite description paragraph 7 (Pages 204-205) Paragraph 2.1.1 (Pages 36) Please refer Apollo general description Page 252
1.19	Supported protocols and standards	NMS must support monitoring of different types of devices with the following protocols: -SNMP v1-3; -Telnet / SSH.		* End-to-End Management Suite General Description * Neptune Reference Manual	Please Refer End-to-End Management Suite General Description 103,285,284 Please refer Neptune Reference Manual 432,440
1.20	Integrated tools	NMS must ensure that additional tools can be called, such as: -ping; -traceroute; -telnet; -ssh.		* LightSOFT Topology Management Guide * End-to-End Management Suite General Description * Neptune Reference Manual	Please see End to End managmnet suite pragraph 8.3 (Page 211) Please see End to End managmnet suite pragraph 111.10.5 (Page 284) Please see Neptune Reference manual paragraph 21 (Page 343) Please see Neptune Reference manual - Standarts and references page 442 (RFC4250/4251/4253/4254) Please refer LightSOFT V15.5 Topology Management Guide page 120,105
1.21	Event Summary	NMS displays an event dashboard for identifying, receiving and assigning generated alarms.	Comply	* End-to-End Management Suite General Description	Please see End to End management Suite description (Pages 97,98,104)
1.22	Event Search	NMS must be able to search between active and historical event messages, specifying search period, priority, keyword and other parameters, and export search result to a text file.	Comply	* End-to-End Management Suite General Description	Please see End to End management Suite description (Pages 97,98,104)
1.23	System events	Event logs must record actions taken by administrators / users and the time at which the action was performed.	Comply	* End-to-End Management Suite General Description	Please see End to End management Suite description Page 261 (Paragraph 11.5)
1.24	Data display panel	NMS should have an integrated role-based access module so that different users and / or user groups with different rights can create their own specific dashboards.	Comply	* End-to-End Management Suite General Description	Please see End to End management Suite description Page 253-260

1.25	Equipment compatibility and auto provisioning	NMS must perform equipment configurations in a centralized manner using configuration templates prepared by the manufacturer or created during the project. Scope of the project must include development of templates for typical services, including MPLS services, used in the Network Solution. This functionality can be implemented using a third-party product.		* End-to-End Management Suite General Description	Please see End to End management Suite description Page 110-121 Paragraph 5
1.26	Third Party Equipment Compatibility	Functionality of the NMS for monitoring and controlling third party equipment must be sufficient to perform integration work for which requirements are formulated in clause 4.10.7 of the Technical Specification.		* End-to-End Management Suite General Description	<p><b>Please see End to End management Suite description Page 308-309</b></p> <p>1. In order to fulfill the integration we require the HW to be delivered to Israel (1st preference) or have an uninterrupted remote connection to it (via a proxy/host PC).</p> <p>2. The integration is based on SNMPv2 or SNMPv3.</p> <p>3. The integration is based on standard MIB only.</p> <p>4. The solution is based on Solaris OS.</p> <p>5. The integration is based on device capability to send traps/alarms to SNMP manager.</p> <p>6. The proposed solution includes HW inventory, alarms, GUI cut through to native web based application and topology connectivity support by LS physical topology map for ethernet based links.</p> <p>7. Other requirements will be covered with open source products and scripts.</p>
1.27	Service level measurement	NMS must have a service level measurement (SLA) measurement module to track service quality in terms of both availability and efficiency. Packet loss, delay and fluctuation (Jitter) parameters must be measured. This functionality can be implemented in a non-integrated third-party product.		*LightInsight general description	LightInsight general description
1.28	Threshold setting	NMS must ensure creation and monitoring of the thresholds related to the key availability and performance indicators of the network	Comply	<p>* End-to-End Management Suite General Description</p> <p>* Fault Management and Performance Monitoring</p>	<p>Please see LightSOFT Fault management and PM Guide paragraph 1.2.4.6 (Page 44,45) + paragraph 1.7 (Page 57,58)</p> <p>Alarms are generated when thresholds are crossed (Threshold Crossing Alarms or TCAs). Accurate PM reporting helps troubleshoot performance issues and maintain SLA requirements.</p> <p>Please see End to End management Suite description paragraph 9.1 (Page 225-228)</p>
1.29	Efficiency	Monitoring and mapping of network device and its ports availability and performance indicators (bandwidth, packet loss, packet latency, errors, rejects, CPU and memory load) using. Network topology depicts second level connections and their load.		<p>*LightInsight general description</p> <p>* End-to-End Management Suite General Description</p>	<p>LightInsight general description (LightInsight modules included in BOM)</p> <p>OAM and maintenance</p> <p>Please see End to End management Suite description Paragraph 8 (Pages 206-218)</p>

1.30	Service mapping	NMS must provide MPLS services such as LSP, L2 / L3VPN, pseudowire, etc. end-to-end detection and rendering (i.e., when selecting a particular service, it must visually represent service termination nodes, backup paths, intermediate nodes, ports, etc.).		* End-to-End Management Suite General Description	Please reref End-to-End Management Suite General Description page 110-121 Paragraph 5 & 5.5.2
1.31	Configuration Management	Real-time device configuration monitoring and notifications, alerts on configuration changes that have occurred.		* Neptun General description	
1.32	Configuration versioning	Automatic backup and archive of device configuration and to restore an older version of configuration.		* NE DB Backup & Restore description	Please refer NE DB Backup & Restore document Please refer Neptune General description Page 237 The platform features a large-capacity on-board NVM that stores a complete backup of the system's software and node configuration. This ensures superior management and control availability.
1.33	Software management	Centralized software update. Ability to select multiple devices for software upgrade at the same time.		* End to End management Suite description	The main controller card enables easy software upgrades using a remote software procedure operated from the EMS-NPT management station or LCT-NPT craft terminal. The card can store different software versions simultaneously, and enables a quick switchover between different versions when required. Please see End to End management Suite description paragraph 3.9 ( page 88)
1.34	Scalability	NMS must be scalable and capable of managing at least 3000 network devices.		*LightSoft Release Notes	Please refer LightSoft Release NotesPage 5
1.35	Interfaces for control systems	NMS must have at least two NBI (Northbound interface) interfaces for data transmission to the Customer's IT service (ITSM) and other management systems using REST API or other means to perform integration work for which requirements are formulated in Technical specifications Section 4.10.16. Additional third-party intermediates included in the offer may be used for this integration work with the Customer's ITSM system.		* End to End management Suite description	Please refer End to End management Suite descriptionpage 286-290 SNMP GW NBI interfaces included in BOM
1.36	Login	Logging in to NMS must be done using secure SSH, HTTPS, or equivalent protocols.		*End to End management Suite description	Please refer End to End management Suite description paragraph 11 (Pages 242-276) Please refer Apollo Security General Description
1.37	Access control	User authentication must be performed locally and using at least one of the authentication tools: RADIUS, TACACS +, LDAP over SSL, SAML.		*End to End management Suite description	Please see End to End management Suite description paragraph 11 (Pages 242-276) CUA- Please see End to End management Suite description 273-274 Included in BOM
1.38	Secure management	Data exchange between NMS and managed network devices must be encrypted using secure protocols.		* Neptune Security General Description	Please refer Neptune Security General Descriptiondocument

1.39	Integrity	All of the above listed functionality and requirements must be implemented using the same graphical user interface (GUI), without the use of additional software or CLI tools. Applicable exemptions are specified elsewhere in requirements of this Annex.		*End to End management Suite description	Please see End to End management Suite description Page 14-18 (paragraph 1.2)
1.40	Licenses	Offer must be accompanied by all necessary licenses required to activate all required NMS services and functionality.	Comply	*BOM	All required licenses included in BOM
1.41	Warranty	Offered equipment and all supplied hardware and software components must be under warranty service either by equipment manufacturer or by an authorized service representative. Warranty service must include free repair and replacement of defective components. For additional warranty repair and maintenance requirements, see Section 4.12 of the Technical Specification.		Ribbon - ECI's Standard Warranty Terms Litrail Ribbon - ECI's Maintenance Services Description Packages & SLA Litrail	Please refer Ribbon - ECI's Standard Warranty Terms Litrail Please refer Ribbon - ECI's Maintenance Services Description Packages & SLA Litrail