

Network Operations Center (NOC)

Customer: City of Superior, Wisconsin

Response to RFQ #: 24-42-IT

Presented by:

Ceragon Networks, Inc. (Ceragon)

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1 EXECUTIVE SUMMARY

At Ceragon, we recognize the value of building strong partnerships with our customers. Our goal is to be more than just an equipment provider - we aim to be a trusted advisor and long-term partner.

Since its inception over 26 years ago, Ceragon has been a leading solutions provider of wireless transport. We have also developed our **telecom management solutions** to provide more efficient operations for our customers. Our growth and success are founded on the value of intelligent management tools, methods, and processes.

This document describes Ceragon's Network Operation Center (NOC) services approach, and an overview of our solution offering to ConnectSuperior.

Ceragon's NOC service solution is built on extensive experience with similar scopes of work, as outlined by ConnectSuperior in this RFQ. Ceragon looks forward to gaining a deeper understanding of ConnectSuperior's service goals and offering insights into the available tools, processes, and reporting capabilities.

Ceragon's NOC services will enable ConnectSuperior to focus on its statutory goals and delivering effective services to County residents. We offer a reliable alternative to investing in new operational technologies and the challenges of acquiring, training, and retaining network operations staff.

Ceragon's NOC service approach will provide following benefits for ConnectSuperior:

- Improved network performance, efficiency, and availability
- Reduced downtime
- Better capacity planning
- Single-sourced systems monitoring capabilities
- Reduction of OPEX
- Optimization of CAPEX
- Access to technical expertise & competencies
- Simplify organization and processes

Ceragon, as a customer-centric company, is dedicated to delivering exceptional customer experience and satisfaction, prioritizing ConnectSuperior's needs while offering faster innovation and implementation. We are large enough to provide peace of mind, yet small enough to offer personalized care and tailored solutions. As a partner for the long term, Ceragon will align processes and metrics to meet and exceed ConnectSuperior vision and deliverables.

If ConnectSuperior determines that Ceragon's response is deficient in any way, Ceragon respectfully requests to be promptly notified and be given the opportunity to correct any such deficiency. Please forward any questions regarding this solicitation response to Todd Theilmann, Director SLED NA, tel. 952-471-1213, email: toddt@ceragon.com.

2 NAME, ADDRESS, AND A COMPANY PROFILE (RFQ 4.1)

Company name: **Ceragon Networks, Inc.**

Location: **3801 E Plano Pkwy; Suite 400; Plano, TX, 75074**

Years in business: **since 1999**

Number of employees: **72 in US and around 1000 globally**

Owner structure: **Incorporation**

Website: **www.ceragon.com**

Ceragon (NASDAQ: CRNT) is the global innovator and leading solutions provider of end-to-end wireless connectivity, specializing in transport, access, and AI-powered **managed & professional services**. Through our commitment to excellence, we empower customers to elevate operational efficiency and enrich the quality of experience for their end users. Our customer base includes mobile service providers, utilities, public safety organizations, government agencies, energy companies, and more, who rely on our wireless expertise and cutting-edge solutions for 5G & 4G broadband wireless connectivity, mission-critical services, and an array of applications that harness our ultra-high reliability and speed. Ceragon solutions are deployed by more than 600 Customers, as well as more than 1,600 private network owners, in more than 130 countries. Ceragon delivers extremely reliable, fast to deploy, high-capacity wireless solutions for a wide range of communication network use cases, optimized to lower total costs of ownership through minimal use of spectrum, power, real estate, and labor resources - driving simple, quick, and cost-effective network modernization and positioning Ceragon as a leading solutions provider for the “connectivity everywhere” era.

Ceragon provides a variety of **managed services** to assist small and big network operators with the day-to-day monitoring and management of their communication network, along with continuous predictive analytics and in-field maintenance.

Ceragon Networks, Inc. is the US-based agent of Ceragon and is wholly owned by Ceragon. It was incorporated in 1999 in the state of New Jersey.

3 PROJECT TEAM AND KEY PERSONNEL (RFQ 4.2)

The project team depicted in the **Figure 1**, operates within a project-centric structure, providing several advantages by ensuring resources are fully aligned with the customer’s goals and requirements. In our functional organization, team members are grouped by their specific roles and geographic locations, allowing us to deliver specialized expertise across regions. We maintain two NOC Front Offices - one in Europe and another India - to efficiently support customers in different time zones.

For the ConnectSuperior project, we will assign team members with a minimum of three years' experience, possessing the skills outlined in the **Table 1 and 2** below.

Initially, the NOC team will consist of multiple resources with the team size adjusted according to future workload and network capacity.

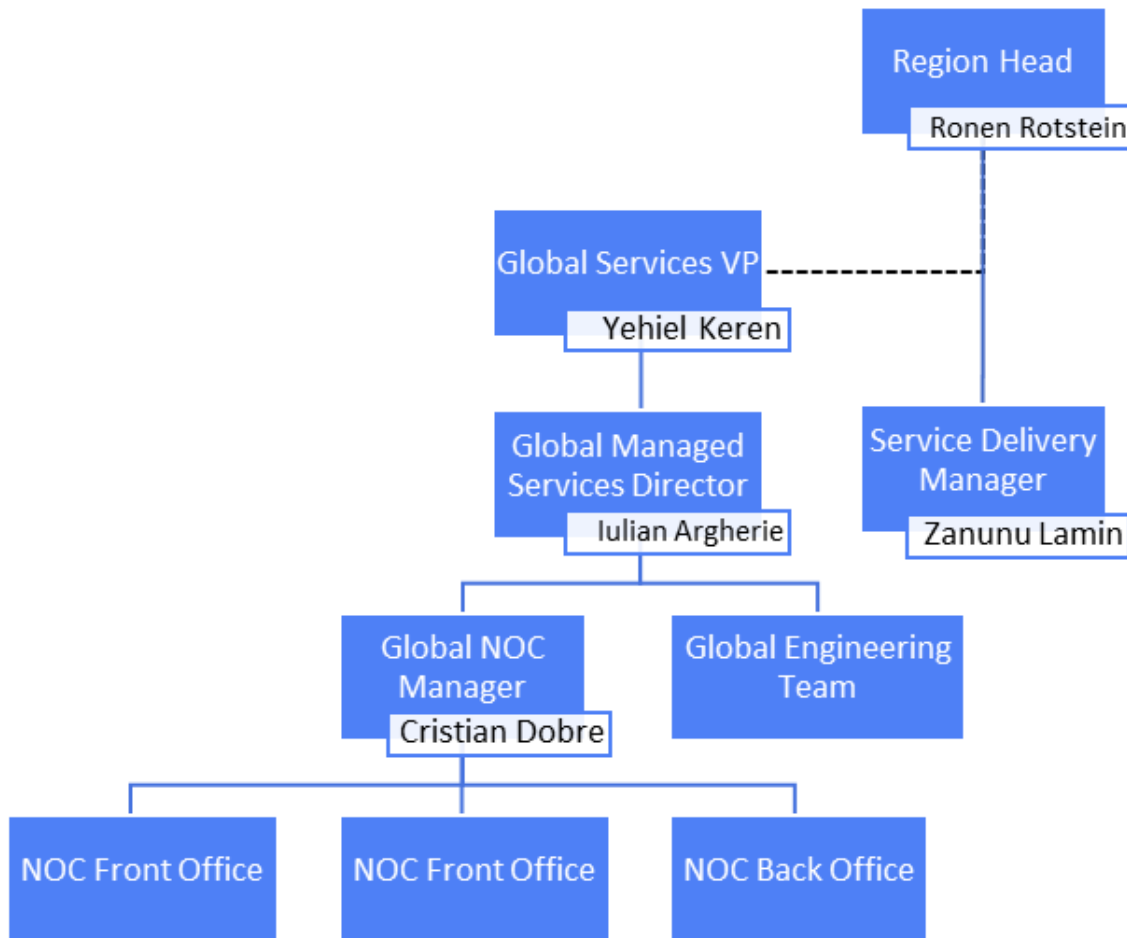


Figure 1. Service Delivery Organization

3.1 SERVICE DELIVERY ORGANIZATION

The Service Delivery Manager will be based in the US, while the rest of the functions will be supported by the Global NOC center.

Table 1. Alarm Monitoring and Front Office responsibilities and skills

Alarm Monitoring and Front Office	
Responsibilities	Skills
<ul style="list-style-type: none"> • Alarm detection and acquisition • Take ownership of Customer's TT • Filtering redundant alarms • Recording and filtering transient alarms • Establish TT priority according to SLA definition • Open and manage alarm records • Dispatch alarms & assign TT • Detect alarm clearance • Analyze alarm records • Perform alarm correlation • 1st level troubleshooting for some alarms • Impacted resources assessment and services evaluation 	<ul style="list-style-type: none"> • 3-8 years NOC experience • multivendor exposure • Cisco certifications • multivendor certifications
	Operations: 24/7/365

Table 2. Back Office responsibilities and skills

Back Office	
Responsibilities	Skills
<ul style="list-style-type: none"> • Run tests against the impacted resources • Identify root cause • Find the resolution/workaround for the incident • Update trouble reports • Support escalated fault management • Perform functional tests • Implement workaround • Create a problem ticket • Perform network diagnostics 	<ul style="list-style-type: none"> • 5-15 years NOC experience • advanced troubleshooting • configuration management • ITIL certification • Cisco certification • multi-vendor / multi-technology exposure
	Operations: 8x5 On-call support outside business hours

4 EXAMPLES OF RELATED EXPERIENCE (RFQ 4.3)

Ceragon has been providing services similar to those outlined in Section 5 (Scope of Services) for 8 years. **Table 3** below shows examples of our projects with the scope and complexity similar to this requested by ConnectSuperior.

Table 3. Examples of related experience

<u>Account Name</u>	<u>Scope</u>	<u>Number of NE</u>
Hometown Networks (ISP North America)	Complete outsourced operations and maintenance for the network, including field operations Implementing remote monitoring and troubleshooting using Ceragon Cloud MoM Multivendor environment: Ceragon, Cambium, Cisco , Mikrotik	120
Everstream (ISP North America)	Managed Services the Microwave Network. Event and fault management, on-site break fix, change management.	500
Madiacom (Mobile Operator in Caribbean)	Managed Services for Access Network. Event and fault management, change management, Engineering and Configuration Management	550
Tullow Ghana (Oil & Gas company - Africa)	Ceragon team manage the planning, design and delivery the network. Connectivity as a service to offshore oil & gas platforms. Managed Services for the network. Event and fault management, change management, monitoring over Cloud. Multivendor environment: Ceragon, Pointlink systems, Cisco , EdgeCore	45
KONGSBERG (Government - EMEA)	Complete outsourced operations and maintenance for the Critical network infrastructure (Harbor Authority) Implementing remote monitoring using Ceragon Cloud NMS architecture for Ceragon and Cisco equipment (16 Ceragon links + 16 routers) Hosting of the NMS/server is managed by Ceragon and is transparent to the customer.	48
Claro Argentina (Mobile Operator in LATAM)	Managed services of Backhaul Planning, Optical Planning, Infrastructure Management, MW Preventive Maintenance, Optical Predictive Maintenance. Solutions that also include Optimization and preventive maintenance, Capacity planning and topology optimization. Managing aspects of the NW Information received from multiple sections to the Core sites.	6000

Claro Paraguay (Mobile Operator in LATAM)	Managed services of Backhaul Planning, Infrastructure Management, including Energy and Space management. Providing Optimization and preventive maintenance, Capacity planning and topology optimization. Managing many aspects of the NW Information.	700
Claro Uruguay (Mobile Operator in LATAM)	Big focus in Fiber. Managing also Microwave, infrastructure Backhaul Planning. Optimization and preventive maintenance, Capacity planning and topology optimization.	500
Optus (Mobile Operator in Australia)	Ceragon team manage the planning, design and delivery of links in short time. Installation of 3rd party equipment's as well and End to End Responsibility. Technology leadership by combining professional services and advance tools	1000
Telcel (Mobile Operator in LATAM)	Field corrective and preventive maintenance	1400
AT&T (Mobile Operator in LATAM)	Provided reliable transmission to connect both countries. Energy Saving, reduced backhaul power consumption, providing Field corrective and preventive maintenance	1200
Vodacom (Mobile operator – Africa)	Technical Support, Service level maintenance for Ceragon install base and RMA coordination and back office	26
Fitel (Government – LATAM)	Turnkey transport network: IP/MPLS, P2P, PtMP, CPE, WIFI (Training, TSS, Engineering, L2 and L3 Planning, Staging, Installation & Commissioning)	1000
Total Play (Telecom Operator in LATAM)	Field corrective maintenance	400

The Ceragon Team has extensive experience in monitoring equipment from various vendors. **Table 4** lists some of the equipment brands we monitor.

Table 4. Examples of the equipment brands we globally monitor

Vendor	Type	Node Type
Ceragon	Transmission	Access Transmission
Ericsson	Transmission	Access Transmission
Huawei	Transmission	Access Transmission
Cisco	Transmission	Router/switch
Nokia	Transmission	Router/switch
Ceragon	Transmission	ADM
Exalt	Transmission	Access Transmission
Ericsson	Radio	Access RAN
Juniper	Transmission	Router/switch
Mikrotik	Transmission	Router/switch
Cambium	Transmission	Enterprise Point to Multipoint Links
ECI	Transmission	ADM
Cambium	Transmission	Access Transmission, WIFI
Primatel	Transmission	Enterprise Point to Multipoint Links
Ceragon	Transmission	Router/switch
EdgeCore	Transmission	Switch
Nokia	Radio	Access Radio, IP RAN
ZTE	Transmission	Access Transmission
Motorola	Radio	Access RAN

5 SCOPE OF SERVICES (RFQ 4.4 AND 5)

Ceragon NOC Services enables to effectively outsource the management of Nokia IP network. Our comprehensive portfolio of managed services equips us to help you achieve your strategic goals. While Ceragon operates and maintains your network, you can focus on core activities and public services.

We provide a sound alternative to investing in new operations technologies and acquiring, training, and retaining network operations staff. Using a single point of contact through a local presence, we remove the worry of managing the network, allowing you to focus on core County functions.

NOC Services provides:

- Global, 7 x 24 x 365 operations support and technology and project management expertise to help you initiate new services and leverage new technologies quickly.
- High quality, reliable services enabled by our continual investment in staff skills and state-of-the-art technology.

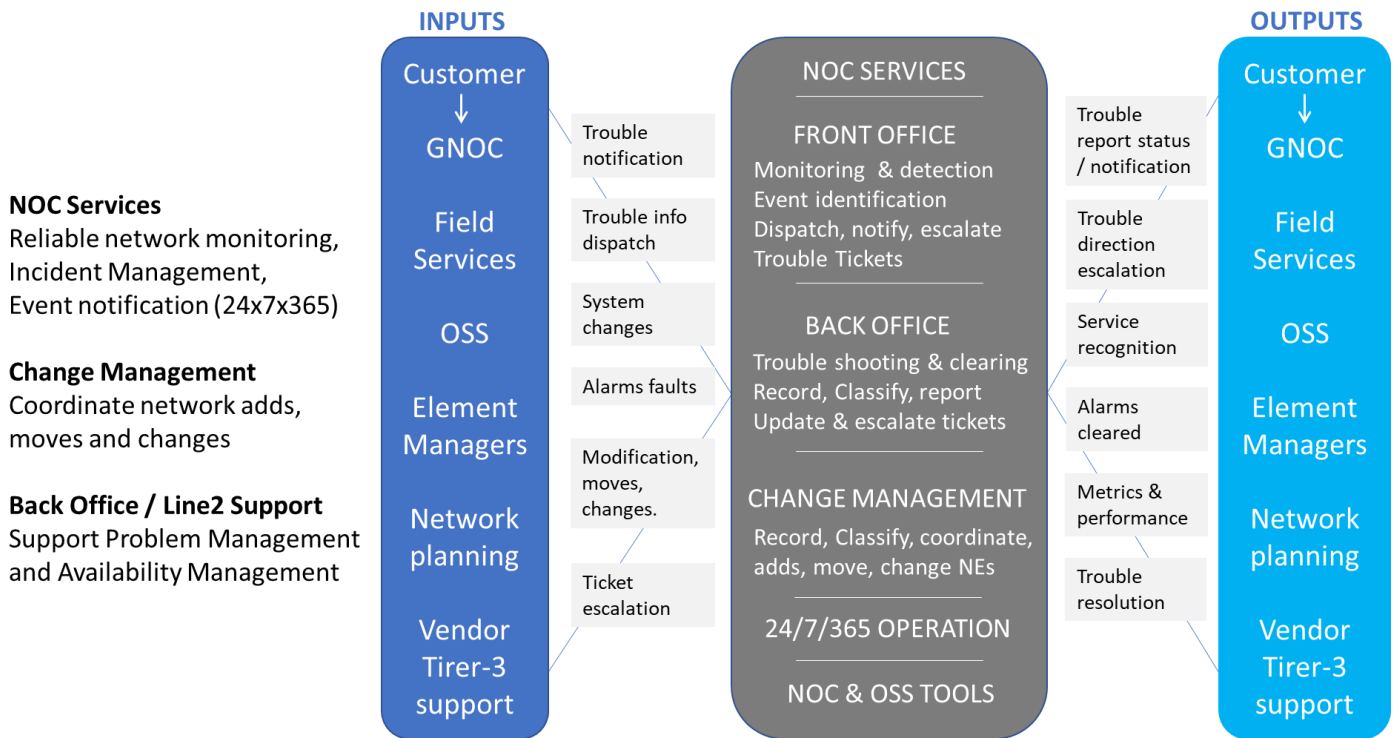


Figure 2. General view of NOC functions and organization

Ceragon utilizes a Multi-vendor, Multi-domain, Multi-Technology, Multi-customer, Multi-function, and Multi-service otherwise referred to as our **Manager of Managers (MoM) SW/Service assurance Umbrella** platform. The system can perform the following:

- Fault management: Real time event/Fault detection
- E2E network monitoring
- Integration with ticketing tool (Salesforce/Lightning): Intelligent alerts & ticketing triggering, Customer Care Summary
- E2E Performance Management – provide real-time insights into network performance.
- Network Inventory Management
- Provide on-demand and ad-hoc reports
- Provide a holistic view of the network (Dashboard), customizable Dashboards
- Provide smart data fusion and analysis to enable providing insightful information for finding the network issues/fault source

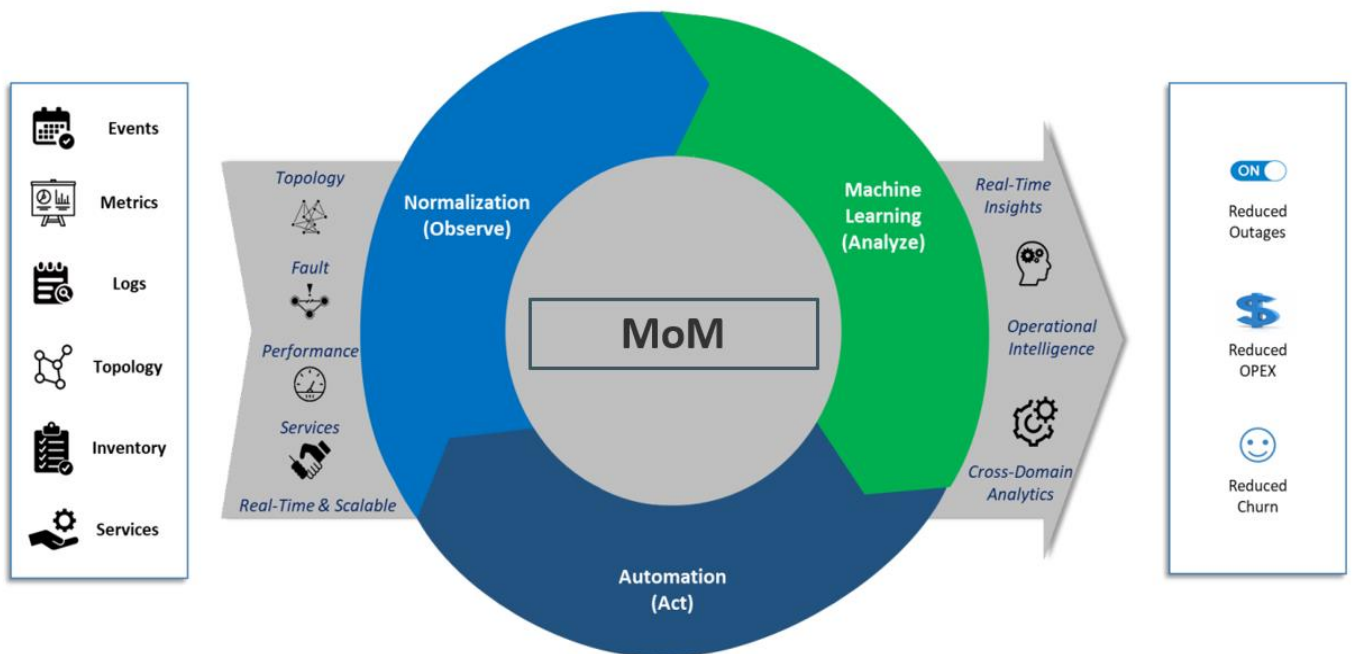


Figure 3. Manager of Managers Solution

The MoM tool provides a unified E2E Network View of monitoring across different domain with different levels of views (from executive level to deep technical view) from a single trusted/centralized source of information using a data lake. It collects data from multiple data sources such as Network Elements (NE), Operations Support System (OSS), Business Support System (BSS), Enterprise Management System (EMS), Network Management System (NMS) & other third-party tools such as a Fault Management System, Inventory Applications, Self Organizing Network (SON), Customer Experience Management (CEM) and a trouble-ticket application with appropriate Application Programming Interface (API) integration and interfaces to generate a unified visualization platform NOC personnel.

The Trouble Manager tool (**Salesforce Lightning**) connects Front Office (Level1) and Back Office (Level2). Trouble Tickets are initiated in Level1 and sent to Level2 for further work and resolution. The personnel at this level provide domain specific expert level support. They know a specific domain, such as IP

transmission, and work on the system through its related Element Management system and other domain specific tools.

All managed services are bound to SLAs for their area of responsibility. These SLAs relate to the tasks performed at that tier and are based on and contribute to the availability required by the network. In addition, this level has access to and can collect data related to the Key Quality Indicators (KQIs) and Key Performance Indicators (KPIs) that are levied on the actual network components. This data can be collected and reported on to customer business level interests.

Our managed services offering is very flexible in terms of the OSS Tools and the OSS Data required to provide the services. Ceragon can supply services utilizing the existing customer tools and data or we can provide the tools and data as initial CAPEX or sometimes amortized with the services OPEX. We can also utilize a combination of legacy and new tools such that technological upgrades can be implemented as network size and need, dictate over time.

The OSS Processes re-engineering can also be provided as part of our offering. Ceragon has great experience in analyzing processes and re-engineering them to the most efficient form. This results in efficient personnel usage and a related reduction in OPEX and therefore service costs.

5.1 SOLUTION DETAILS

Network Surveillance delivers reliable network monitoring and event notification service, 24 x 7 x 365 days a year. Ceragon experienced technician's work with the Customer to develop agreed thresholds for alarm reporting and to ensure the appropriate parties are notified of critical or service-affecting problems.

Fault Resolution and Management utilizes diagnostic tools and systems to isolate faults, initiate remote troubleshooting, re-initialize or reload peripherals, and verify alarms. If remote trouble clearing techniques are unable to correct the event, the technician will escalate this event to the next designated level of support.

Preventative **Analysis** utilizes Ceragon network support centers' analysis teams to continuously monitor data retrieved from the network elements and respond to changes, trends or indications that may impact performance levels.

The **Trouble Management** service tracks and ensures closure of trouble tickets that are initiated as a result of performing Surveillance, Fault Management and Preventative Analysis functions.

Standard Reports on Network activity are generally distributed electronically and are examined on a regular basis at service review meetings between Customer's staff and Ceragon.

Performance Reporting identifies the overall availability (outages), performance of the network segments and the network as a whole.

5.2 SERVICE DESK

The Service Desk handles key tasks such as incident management, including receiving alerts, logging issues, and escalating problems. It also prioritizes incidents, facilitates root cause analysis, and tracks resolutions. The following sections describe our Service Desk functions in more detail.

5.2.1 FRONT OFFICE ACTIVITIES

NOC Front Office (FO) group takes care of the network assurance, first level network operation and maintenance actions.

NOC Front Office team oversees the following activities (with split by network domains):

- Network alarms monitoring on a 24/7/365 basis including filtering, categorization and prioritization based on severity and defined rules, network alarms acknowledgment.
- First level of troubleshooting (fault/incident management process) including impact analysis and first level restoration procedures; escalation to 2nd level for technical support NOC Back Office (BO) groups in case of no resolution; engagement of Field Services (FS) group for onsite activities when needed; phone support of FS troubleshooting activities when activity is assigned to Front Office team; continuous and on demand notification about service restoration and fault resolution status according to procedure agreed; testing of fault resolution.
- Outage notification to assigned groups. Notification level and distribution list depend on the impact of the outage.
- Incident ownership; Major incidents follow-up; Major incidents reporting; Escalation in case of SLA overdue.
- Network Trouble Ticket (TT) Management including creation of a Trouble Ticket on Salesforce/other system for network faults detected; tracking and update of TT status (originated by network faults) during its lifecycle (e.g.: opened, assigned, taken in charge, dispatched, resolved, closed, etc.) tracking of all key information on TT (e.g.: date/time of TT creation, organizational group that created TT, description of first diagnosis, etc.); correlation between network trouble ticket and other network alarms; notification/escalation of TT to NOC BO teams for resolution or Field Operations group for on-site activities when needed.
- Change calendar monitor. The FO NOC will be contacted by the change engineers before they start executing the change. NOC is expected to verify the change calendar and current operational situation (stop/delay when too many incidents are open or when a high or critical incident is on-going on the change domain). After the change engineers finalized the change, they need to inform the FO and FO verifies that no alarms are open. The notifications to NOC Front Office at start & end of change implementation should be done by both phone & email.

5.2.2 BACK OFFICE ACTIVITIES

NOC BO provides specialized technical support for all network elements (which are included in Customer network and make the object of this contract). NOC Back Office groups consist of engineers/experts familiar with different domains, different technologies, and different vendor equipment.

This group provides second level troubleshooting support and is available during the office hours and performs the on-call duty on 24x7 hour basis for handling escalated problems.

NOC Back Office team oversees the following activities:

- Second Level Troubleshooting (incident management process) including specialized technical support on specific technologies and network domain, analysis, troubleshooting and fix of the network issues raised by NOC Front Office working in cooperation with network vendors in case their support is needed; escalation to the third level of troubleshooting (engagement of vendor support for resolution); engagement of Field Services for on-site activities when needed, coordination and on call support of Field Services for troubleshooting activities.
- The NOC Back Office team is responsible for initiating the Problem Management process in case that an incident/fault has been resolved with a workaround and a final resolution is needed. For this purpose, NOC BO is responsible for issuing a problem ticket to the Customer Problem Management team, if applicable.
- NOC BO group is responsible for handling incidents tickets related to network performance degradation. Performance trouble tickets are opened by NOC FO based on alarms triggered by specific Network KPIs violation.
- NOC BO performs network traces, makes end to end analysis, root cause and event correlation analysis for fixing the malfunctions which affect network performance.

The following **Table 5** describes the main roles involved in the Incident Management Process:

Table 5. Clear responsibilities definition is key for effective incident management

Role	Responsibilities	NOC team
Alarm Monitoring Engineer	Alarm detecting and acquisition Take ownership of Customer TTs Filtering of redundant alarms Recording and filtering of transient alarms Set up appropriate Priority for TT due SLA definition Opening and managing of alarm records Dispatching of alarms/Assigning TT Detecting of alarm clearance Analyzing of alarm records Performing correlation of alarms Performing first level of troubleshooting for certain alarms	Front Office Engineer

Role	Responsibilities	NOC team
	Assessment of the impacted resources Evaluation of impacted services	
2nd Level Incident Engineer	Performing diagnostics Running tests against the impacted resources Identifying cause of specific trouble Finding the resolution/workaround for trouble Updating of trouble reports Supporting escalated fault management Performing functional tests of repaired resources Implementing workaround Create a problem ticket	Back Office Engineer
On-Site Engineer	On site software repair On site hardware repair Preventative maintenance	Field Service

5.2.3 INCIDENT MANAGEMENT PROCESS – HIGH LEVEL PROCESS DESCRIPTION

Incident Management Process, generally depicted in **Figure 4** below, needs to be agreed and updated during the onboarding phase. Incident manager shall be added to coordinate Critical & Major outages from the network and a specific procedure shall be in place.

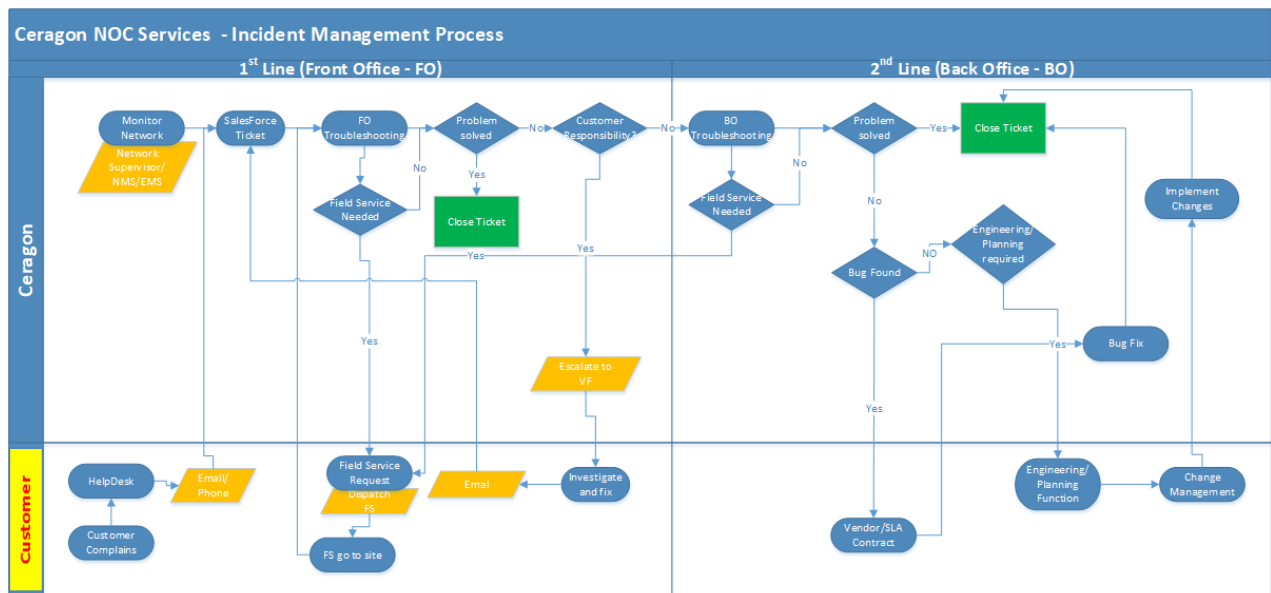


Figure 4. Incident Management Process flow chart (enlarged version attached to the offer)

5.2.4 MTRR

Service Levels are calculated using data in the ticketing system and/or data captured in the logs for measurement of the performance of incident handling.

In the **Figure 5** below, Service Level of an incident consists of the following checkpoints:

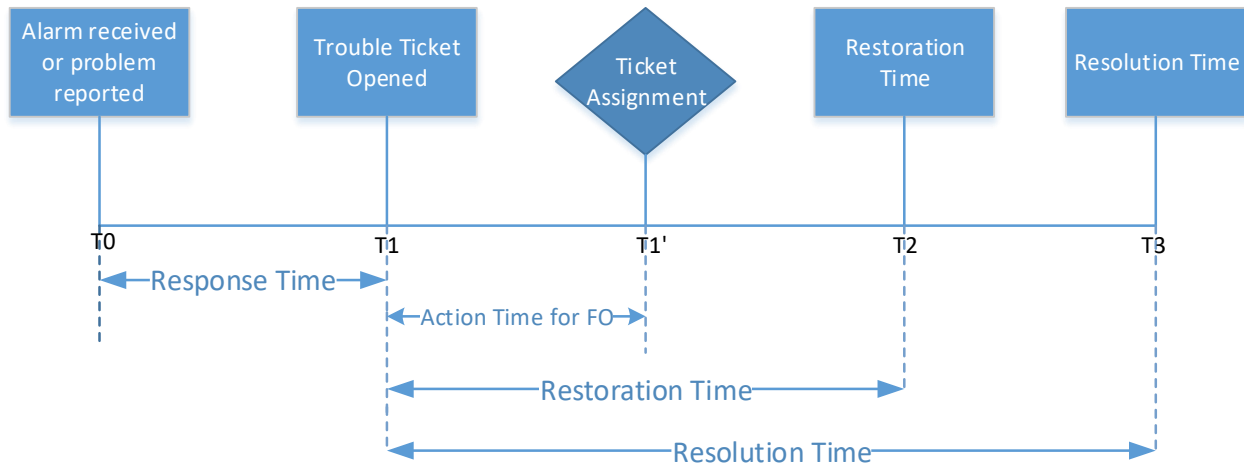


Figure 5. Trouble Ticket time management definition

Where:

- “Response Time” means the Time between T0 and T1, which starts from the earlier of the receipt of an alarm by Ceragon and “Response” means the action when Ceragon opens an incident or opening a trouble ticket.
- “Restoration Time” means time between T1 and T2 and “Restoration” means the actions required to remove effects of the incident. Restoration may imply limited functionality and/or degradation of system performance.
- “Resolution Time” means the time between T1 and T3 and “Resolution” means actions required to prevent an incident from reoccurring and/or removal of any underlying cause of the incident. When restoration is implemented, the system is restored to the normal operational state it was before Incident.
- Restoration and Resolution requires actions from Ceragon and Customer. Ceragon shall not be liable for any failure to fulfil Restoration or Resolution other than in case of a failure of Ceragon to provide any Support Services.

Table 6. SLA for Response Time (example)

Definition	Severity Levels	Type of Service	Target KPI	Target SLA
Response Time (Ticket Creation)	P1(Critical)	MTTResponse	1 hour	95% in Target KPI
	P2(High)	MTTResponse	4 hours	90% in Target KPI
	P3(Medium)	MTTResponse	12 hours	85% in Target KPI
	P4(Low)	MTTResponse	48 hours	60% in Target KPI

Table 7. SLA for Action Time (example)

Definition	Severity Levels	Type of Service	Target KPI	Target SLA
Action Time (Ticket assignment)	P1(Critical)	MTTAction	1 hour	95% in Target KPI
	P2(High)	MTTAction	2 hours	90% in Target KPI
	P3(Medium)	MTTAction	4 hours	85% in Target KPI
	P4(Low)	MTTAction	48 hours	60% in Target KPI

KPIs and additional metrics related to the availability of network components can be defined during the onboarding process. Above KPIs are to be used as an example / baseline of discussion between parties.

5.2.5 SEVERITY DEFINITION

The **Table 8** below is an example and specific severities/priorities shall be agreed and updated during the onboarding phase.

Table 8. Severity Definition (example)

P1(Critical)	Conditions that severely affect the primary functionality of the system and because of the business impact to the customer require non-stop immediate corrective action, regardless of time of day or day of the week. This includes conditions that severely affect service, traffic and/or maintenance capabilities, and require immediate corrective action.
P2 (High)	A High Service Request includes cases in which the system is usable, but a condition exists that seriously degrades the system's operation, maintenance, or administration and requires attention during pre-defined standard hours to resolve the situation. The urgency is less than in critical situations because of a lesser immediate or impending effect on system performance.
P3 (Medium)	Medium Service Requests are issues related to other problems of a lesser severity than "critical" or "major" such as conditions that cause little or no impairment of the network. Medium Service Requests are problems that are tolerable during system use, do not significantly impair the functioning of the network.
P4 (Low)	General inquires Nonservice affecting faults

5.2.6 CHANGE MANAGEMENT BASELINE PROCESS

ConnectSuperior is accountable for the Change Management Process. Unauthorized changes are not allowed in the network.

Change Management Process should be agreed during the onboarding process. CAB meetings, specific stakeholders, specific approval for different changes shall all be agreed and documented.

In high level, three level of changes shall be defined:

- Standard Changes
- Normal Changes
- Emergency Changes.

Standard Changes are changes which have a specific procedure and are pre-approved.

Normal Changes shall go through the Change Management process, CAB meetings and approvals. There can be defined additional levels of changes based on the risks and size.

Emergency Changes usually come from Event/Fault Management and require an immediate fix. These shall be executed as soon as possible as probably are presenting a high risk on the systems/network. Even if a workaround is implemented, this needs to go through Change Management processes and documented accordingly to become a final solution.

Any change request should contain the following data:

- Scope of work
- Affected network elements/services/customers
- Date and time, name of the person in charge with the change
- Work Procedure
- Rollback procedure.

Any change will be notified to Operational teams (NOC Front Office). Any introduction/retirement of devices shall be notified to the Ceragon team. ConnectSuperior needs to notify Ceragon NOC when On-Site or Remote activities are performed by their personnel (or 3rd party) which affects network functionality (could generate alarms on the Network Elements).

Detailed RACI Matrix shall be defined during the onboarding process.

5.2.7 UNIFIED ASSURANCE – MANAGER OF MANAGERS

Our solution offers a web-accessible interface for Connect Superior staff, providing visibility into both current and historical incident management, service requests, and change management activities. The following sections briefly outline the functionalities of our solution.

5.2.7.1 SIMPLIFYING AND OPTIMIZING OPERATIONS

Unified Assurance is a single software product providing unified fault, performance, topology, root cause analysis and service level management within a hugely scalable platform. It also provides sophisticated event analytics and machine learning using historical and real-time data to help you quickly and accurately pinpoint and automatically resolve the root cause of service impacting events.

Provides Unified Service Assurance

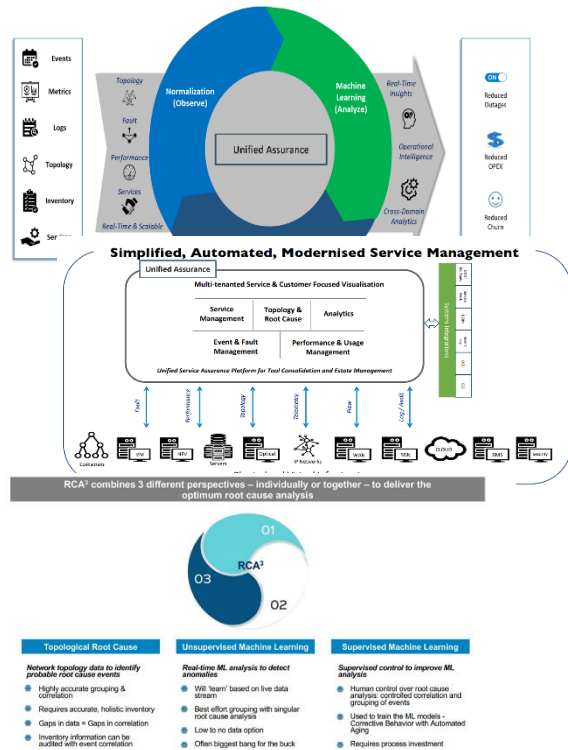
- A single platform to manage all services across a variety of technology domains & networks.
- A single source of truth for all service-relevant data
- End-to-end visibility your services
- Enhanced end customer experience
- Improved speed of delivery of new services

Open & Flexible Architecture:

- Open Standards throughout
- RESTful JSON API
- Multi-tenant HTML5 GUI

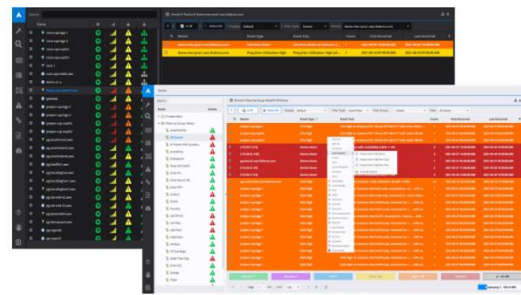
Enables:

- Legacy Tool consolidation
- Closed Loop Automation
- Zero-touch Management of dynamically changing Hybrid & Virtual Services



5.2.7.2 UNIFIED FAULT MANAGEMENT

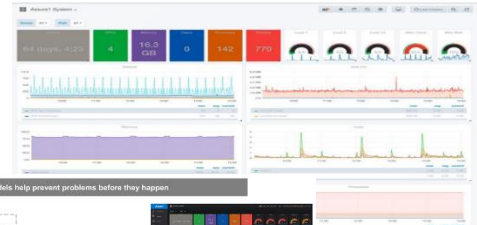
- Manager of Manager Approach
- Event Collection from Any Device or EMS
- Unsolicited Event Collection
- Custom Action Policy Engine
 - Event Enrichment
 - Advanced Event Processing and Automation
- Built-in Historical Event Database



- Fault Management with Analytics
 - 3x RCA Correlation (Human/Machine/Topology)
 - Vendor Agnostic; Physical and Virtual
 - Open, extensible, ML/AI based Analytics.

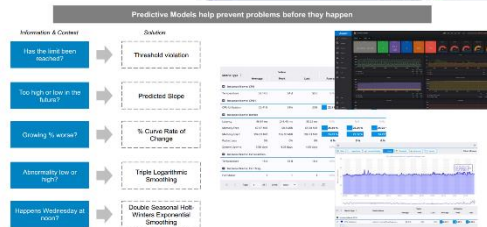
5.2.7.3 REAL-TIME PERFORMANCE MONITORING

Facilitate collection of performance and usage metrics from any network device, server or storage environment covering physical, logical and virtualized configurations as well as the applications running across them.



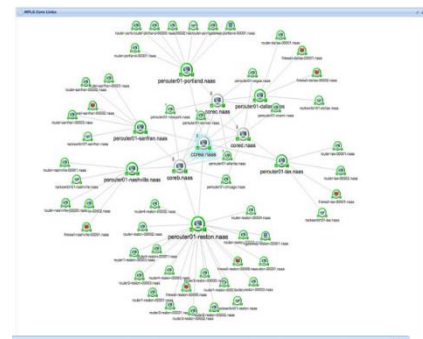
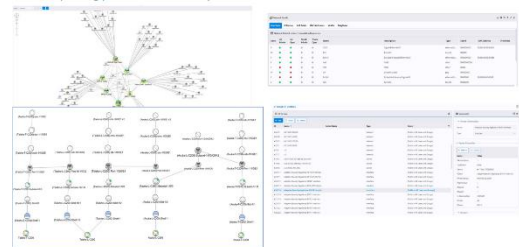
Key Benefits:

- Driving Data -> Actionable Alerts
- Holistic Data Collection Model
- Being Proactive & Predictive



5.2.7.4 TOPOLOGY, INVENTORY AND RELATIONSHIPS

- Stores Cross Domain Topology and Dependencies as Relationships
- Supports Standard and Custom Layers
- Supports Inter Layer Relationships
- Supports Real Time Relationship Updates
 - Inventory & Orchestrator Integrations
 - Essential for SDN/NFV Environments
- Discovered Data Uses
 - Visually (trriage)
 - Supporting Topological Root Cause Analysis
 - Supporting Service Impact Analysis
 - Supporting Service Experience Monitoring
 - Deliver Network Inventory Reconciliation



5.2.7.5 GIS VISUALIZATION

Allows you to visualize the real-time status of devices and services in a geographically based view, allowing zoom down to street/site level.

Visual correlation of external situations that can impair or stop service delivery.

Ability to visually track and dispatch based on external root causes.



5.2.7.6 SERVICE MANAGEMENT AND DASHBOARDS

- Open, Adaptive Service Model with Templating
- Service Quality Management
- Customer Experience Assurance Correlation
- Fully visibility, Unified Dashboards



5.2.8 TROUBLE TICKETING SYSTEM – SALESFORCE LIGHTNING

Ceragon NOC uses Salesforce Lightning for ticketing, enabling efficient tracking and management of customer requests and complaints. Each customer query is converted into a trackable ticket, which is managed and resolved by the NOC team.

Automatic notifications to groups are available for creating tickets, updates and closing.

Dashboards and reports are available and can be sent to specific groups.

5.3 BREAK/FIX

Please refer to Sections 5.2.1 Front Office Activities, 5.2.2 Back Office Activities and 5.2.3. Incident Management Process.

5.4 BACKOFFICE SYSTEMS

Please refer to Section 5.2.2 Back Office Activities.

5.4.1 TECHNICAL ADVISORY GROUP

Ceragon will also focus on better communications by forming a TAG (Technical Advisory Group). The TAG will be created for two primary purposes: to ensure consistency and proliferation of best practice across the organization and act as a single point of contact for other parts of the company, (engineering, software, Field Operations, etc.) on issues pertaining to Network Management. Those issues impacting operations that require analysis and technical recommendation are brought to the TAG.

The TAG group consist of domain subject matter Experts from ConnectSuperior and Ceragon. Issues are raised, discussed, and resolved if possible, during a weekly or monthly meeting. For issues requiring further investigation, the Chairperson may assign an issue to a TAG member. As required, they will seek assistance from other TAG members, other departments within ConnectSuperior, Ceragon, or an outside source. That person is responsible for investigating and reporting findings to the TAG Group at the next meeting. Communication back to management is a key follow-up responsibility of the TAG members.

The TAG will be used as a platform to discuss issues that range from technical to strategic to tactical. As an example, if changes are needed to an existing escalation process, the NOC manager will identify the change needed to the TAG, the change will be evaluated and approved and implemented by the members of the TAG.

5.5 SECURITY OF NOC AND CONNECTSUPERIOR OPERATIONAL ENVIRONMENT

Please refer to Section 5.4.1 Technical Advisory Group

ConnectSuperior and Ceragon will work together to create a plan with specific objectives, for example:

- Setting specific goals and specific measurement
- Business/system impact analyses to understand the impact of potential threads on specific business areas and systems
- Identify the areas most exposed to attacks and with most impact over the business
- Create a plan of prevention, response, and recovery strategies
- Test, train, communicate the policies and plans

ConnectSuperior is accountable for its Business Continuity Plan. Ceragon shall contribute to the IT Continuity Plan and make sure that its policies and procedures are aligned with the ConnectSuperior business and requirements.

5.6 NOC AND BREAK/FIX SUPPORT SLAS

Please refer to Sections 5.2.3 Incident Management Process, 5.2.4 MTTR, 5.2.5 Severity Definition.

5.7 QUARTERLY REVIEWS

Quarterly reviews shall be organized between ConnectSuperior and Ceragon. From Ceragon side, at least Service Delivery manager and NOC manager shall be involved together with relevant stakeholders from ConnectSuperior.

SLA objectives, rollout plan, delivery, improvement proposal, inputs from TAG group and any additional relevant topics shall be discussed.

Frequency of these meetings and specific topics and relevant stakeholders shall be defined during onboarding process.

5.8 PERFORMANCE MANAGEMENT

Escalation matrix is in place in the Ceragon organization. Any conflicts, or discrepancies regarding project will be resolved in a way that is conducive to maintaining the project schedule. To ensure project stay on schedule and issues are resolved, Ceragon will use the following escalation model to provide a framework for escalating project realization issues:

Table 9. Effective escalation process involves top management.

Priority	Definition	Notification	Timeframe
1	Major impact to network operations. If not resolved quickly there will be a significant adverse impact to network operations.	Vice President	Within four (4) hours
2	Medium impact to network operations which may result in some adverse impact and/or schedule.	Service Managed Director	Within one (1) business day
3	Slight impact which may cause some minor operation difficulties.	NOC Manager	Within two (2) business days
4	Insignificant impact to network operations.	NOC Manager	Work continues and any recommendations are submitted via the project change control process

Please also refer to Section 5.4.1 Technical Advisory Group.

Points of Contacts will be provided during onboarding phase, please also refer to Section 5.9 Onboarding Requirements.

5.9 ONBOARDING REQUIREMENTS

5.9.1 IMPLEMENTATION PLANNING

Ceragon and ConnectSuperior agree to perform the following implementation planning requirements:

- Establish a joint Ceragon and ConnectSuperior implementation team.
- Establish a joint implementation plan.
- Review Systems Requirements.
- Review hardware and facilities requirements.
- Identify the organizational structure and interfaces to meet the start-up and ongoing network management, support, and development needs.
- Establish interface processes.
- Communicate Change Management guidelines.
- Establish Trouble Management Business Rules to include Escalation/Notification Policies, Ticket Data Transfer Requirements, Work Order Transfer Requirements, and Data Schemes.
- Review the Service Level Agreement for completeness.

5.9.2 EARLY JOB CONFERENCE (EJC)

ConnectSuperior and Ceragon shall meet to exchange contacts, roles & responsibilities, and services delivery timelines needed to assure commitments are met. This may include but not limited to the documentation outlined:

- Delivery Schedule, including expected In-Service Date
- Customer Network Design Prime & Contact Information
- Network Topology, Network Architecture Diagram and Support plan
- IP Addressing Scheme
- Numbering, routing, treatment plans, etc.
- Network Element Type & Count
- Network Management Prime & Contact Information
- Network Element Conditioning Information; Port Assignments, Element Access, cable pinouts, etc.
- Agree to thresholds for alarm reporting, procedures, and event escalation.

The Ceragon NOC Service Manager will review the Service Level Agreement with the appropriate personnel from all Parties. Any changes requested need to be addressed through the Change procedure.

5.9.3 MANAGED NETWORK CONNECTIVITY BETWEEN CONNECTSUPERIOR AND CERAGON

To provide the services, the following network connectivity must be provided:

- Network connectivity will be terminated, tested, and accepted by both Ceragon and ConnectSuperior at the NOC prior to Ceragon NOC Surveillance, Analysis and Trouble Management services.
- Provision and Installation of hardware, software, and facilities to complete the Managed Network Connection.
- Operation and maintenance of the Managed Network Connection

5.9.4 INTEGRATION TEST PLAN

Ceragon and ConnectSuperior shall define and execute an integration test plan, which shall include the following:

- Determine if network elements and remote monitoring devices meet minimum standards to provide the NOC services. Upgrades to the network elements and remote monitoring devices will be provided if required.
- Validate connectivity between NOC and all network elements at each network site location outlined in the network topology.
- Update the appropriate Operations Support Systems (OSS) with customer's Network Element naming and numbering conventions provided.
- Validate the capability of the appropriate OSS remote login to each network element.
- Provide and execute test plans to verify the network element connectivity and responsiveness required by the services.
- Test the appropriate OSS view of network element's responsiveness (alarms, logs, scheduled events, non-resident programs, resident programs, etc.)
- Test the appropriate environmental, security, and power alarm responsiveness.
- Confirm satisfactory emergency remote access capability.

6 THE RESPONDENT STATEMENT (RFQ 4.6)

Ceragon declares that during pricing phase, Ceragon will make their own examination, investigation and research regarding the method of doing the work, all conditions affecting the work to be done, the labor, equipment and materials, and the quantity of the work to be performed.

7 LIST OF ALL SUBCONSULTANTS (RFQ 4.5)

Ceragon will perform all activities using internal resources, and no external consultants are planned at this stage.

Network Operations Center (NOC)

The undersigned agrees to employ the following listed subConsultants for the following enumerated classes of work and not to alter or add to such list without the written consent of the ConnectSuperior, WI. Use separate sheet as necessary.

	SUBCONSULTANT	CLASS OF WORK
1)		
2)		
3)		

Submitted by:

COMPANY: Ceragon Networks, Inc

ADDRESS: 3801 E Plano Pkwy; Suite 400; Plano, TX, 75074

COMPANY REPRESENTATIVE: Ronen Rotstein, President

8 ADDENDA ACKNOWLEDGEMENT

Network Operations Center (NOC)

I/we hereby acknowledge receipt of the following addenda(s):

Addendum No. 1 _____ Dated: October 23, 2024

Addendum No. _____ Dated

Addendum No. _____ Dated

Addendum No. _____ Dated


I/we further certify that no agreement has been entered into to prevent competition for said work and that I/we carefully examined the site where the work is to take place, and the plans, specifications, form of contract and all other contract documents.

I/we further agree to enter into the contract, as provided in the contract documents, under all the terms, conditions, and requirements of those documents.

* If no addenda were issued, the consultant/firm shall so indicate and sign this document.

Ceragon Networks, Inc.
Company

Ronen Rotstein, President
Representative Signature



Ceragon Comments:

Terms and Conditions of the future contract were not provided.