A Study on Behaviour and Characterization of Communication in UWSN

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***Abstract*— Underwater Sensor Network is the critical network form defined with specification of dynamic topology and network nodes. This dynamic feature increases the Communication criticality and results the communication loss. In this paper, the discussion on the Communication challenges in the network is provided under different aspects. The protocol level, infrastructure level and application specific challenges are discussed. The challenges to the network Communication with relative communication loss in the network are provided in this paper.**

Keywords: Sensor, Communication, Criticality, Application Specific, Layered

I. INTRODUCTION

Underwater Sensor Network is an infrastructure less self organized dynamic network that provides the cooperative communication. Author identified different communication challenges including the Communication, routing, architectural constraints and the application dependency. The mobility and the dynamic alteration of the network topology is also critical while performing the communication and integrating the Communication aspects. The primary concern of this network model is to identify the effective network characterization under Communication concern. Communication in this network is provided under various software driven services including the authentication, integrity, availability, anonymity and confidentiality. The Communication solution and protocol stack specific issue identification was provided for Underwater Sensor Network. The protection against the dynamic behavior and intrusion is the great challenge for Underwater Sensor Network. The potential Communication constraint analysis can be applied in the network at different levels including the node level observation, cluster specific analysis, Sensor agent specific Communication integration and the infrastructure driven Communication analysis. The Communication is also applied at protocol level or the layer specific. This extensive integration is able to provide the reliability enhancement during transmission and while forming the packets. Different Communication components relative to the Underwater Sensor Network are shown here in figure 1.

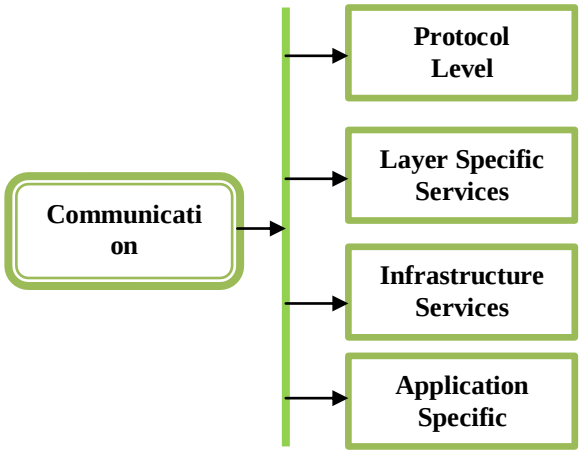

Figure 1: Communication Services in Underwater Sensor Network

Here figure 1 is showing some of the common Communication aspects and the observations required for Underwater Sensor Network. The foremost Communication requirement is at protocol level. The MAC protocol, transport protocol and routing protocols can be improved by Communication integrity to provide the Communication at communication time, transportation time and during the packet formation. This kind of Communication integration does not required specialized infrastructure. Generally authentication driven or the data validation specific Communication constraints are integrated with the protocol itself. Another type of Communication constraint defined here is layered services. The communication in the network is formed under different layers specification. Each of the layers is defined with specific role and the integration of

Communication services is required with these roles. The communication control analysis and the packet verification in generic model can be provided by the Underwater Sensor Network. The infrastructure driven Communication services can be defined by setting up some firewall or including the specialized hardware. This infrastructure can work as the Sensor agents or the region specific control. The gateway filtration specific network Communication integration is also provided for safe network communication. Another Communication aspect defined here is specific to the application. To provide the Communication for particular communication type, particular organization or the user group, the Communication features can be integrated. The organization Communication integration and enhancement can be achieved by these Communication prospects. The figure has explored all these constraints that can affect the network Communication and provides the Communication at architectural level. This architectural Communication integration to the Underwater Sensor Network is shown here in figure 2.

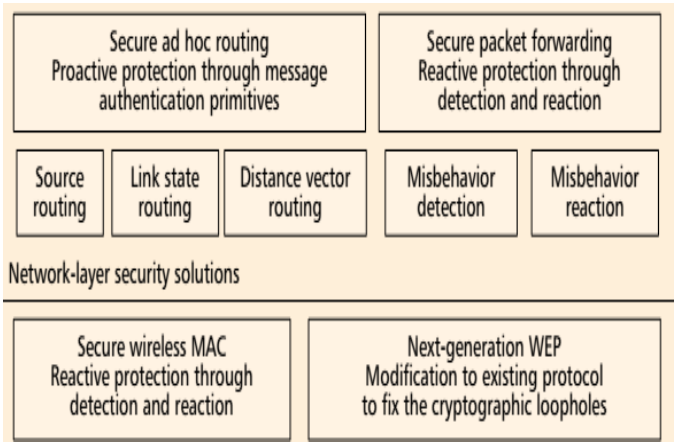

Figure 2: Type of Communication Integration

Here figure 2 is showing the different kind of Communication integrated at different level including the routing aspects and with specification of routing protocol types. This kind of Communication integration is applied on node selection and cooperative communication formation. The network Communication features are also defined as the effective Communication solution. The MAC specific authentication integration is applied to achieve the Communication at lower level. In this paper, the discussion on the Communication requires and the challenges exploration is provided.

II. RELATED WORK

A Underwater Sensor Network is defined in open area with dynamic features including the region switching and new node inclusion. Because of this dynamic nature, the network suffers from various internal and external attacks. Different Communication features are implied by different researchers in terms of authentication methods, preventive methods as well as attack detection methods. In this work, some of the contributions of different researchers for enhancing the Communication services in Underwater Sensor Network are presented. Xue et. al.[1] has defined a Communication framework to analyze the Communication threats and requirements in Sensor 4G networks. A protocol driven Communication analysis in secure environment was provided by the author. Author improved the access control mechanism by setting up the trust and validation vector so that the communication reliability will be improved. A trust adaptive Communication framework was provided by the author. Liyanage et. al.[2] has suggested the integration of Communication services in software defined Underwater Sensor Networks. Author provided the multi-tier Communication approach to provide the secure communication. The improvement to the protocol is provided by applying the host identity analysis. The unwanted access based address spoofing and the defensive method against DoS attack was provided by the author. The attack mitigation and reliability improvement was suggested by the author. Simate et. al.[3] has integrated the network Communication and applied its evaluation in GSM enabled Underwater Sensor Network. An association to the network threats and the identification of weak points is provided by the author. Communication chain integration and relative threat exploitation was provided by the author. Author identified the Communication challenges and generated an authentication driven compromising node rectification method for effective network communication. Suhizaz et. al.[4] has work on the Communication challenges and provided the preventive network communication against popular attacks. A Communication attributes specific integration and relative risk observation was provided by the author. The attack sensitive risk observation was identified by the author.

Seify et. al.[5] has defined a method to reduce the Communication risk in Underwater Sensor Network. Author defined the risk management mythology to manage the risk and perform the relative evaluation with Communication policy specification. The threat analysis in GSM enabled network was provided by the author. A distributed asset driven communication with sensitive information processing was provided by the author. A Communication feature analysis under risk observation was provided by author to reduce the impact of Communication threats. Sharma et. al.[6] has defined a Communication scheme against the jamming attack for Underwater Sensor Network. The method identified the unauthorized packets and congestion situation to provide the detection of jamming attack. The performance evaluation based multipath routing method is provided for secure communication in Underwater Sensor Network. Yang et. al.[7] has discussed the featured constraints against the Communication criticalities in Underwater Sensor Network. The work was applied on open peer-to-peer architecture so that the resource constraint specific dynamic communication was performed. The Communication problem estimation with performance and reliability estimation was provided by the author. Dynamic connectivity based Communication issues were processed by the author to provide layered Communication integration so that the communication throughput will be improved. Zhang et. al.[8] has defined a

work on heterogeneous Underwater Sensor Network with specification of Communication features and constraints. A protocol specific integration and identification of Communication issues was provided by the author. The service integration and the protocol driven estimation provided the author to reduce the data transmission and applied the secure handover in the network. The mobility support and Communication constraint mapping was provided so that effectiveness of network communication will be achieved. Nargunam et. al.[9] applied the Communication scheme in clustered Underwater Sensor Network. A unique characterization of Communication features was provided for shared network for reliable resource allocation. The membership validity based trust evaluation was provided for providing the secure communication in Underwater Sensor Network. Nargunam et. al. [10] has defined the distributed Communication mechanism for Underwater Sensor Network so that the architectural challenges will be resolved. Dynamic topology control estimation with Communication integration was provided so that the layered improvement in the Underwater Sensor Network will be achieved.

Shurman et. al.[11] has provided the Communication key based autoconfiguratin method for improving the communication in Underwater Sensor Network. The identity address specific mapping and improvement to the design phase was provided by merging the Communication constraint to the Underwater Sensor Network. A Communication key specific significant loss reduction and controlled communication was provided. Savola et. al.[12] has defined self measurement based Communication layered integration to the Underwater Sensor Network. Author identified the Communication challenges so that the node level and network level reliability will be improved. Independent network estimation under Communication constraint specification was provided by the author. Shaikht et. al.[13] has provided the integration of Communication architecture in multiple hop communication in Underwater Sensor Network. The control Communication mechanism was suggested using Sensor agent integration. The infrastructure specific attack detection method was provided so that the degree of reliability in the network will be improved. Rishikesh et. al.[14] has defined an enhancement to the Sensor mesh network so that the reliability impact of network will be improved. Author applied the attack analysis with connectivity observation and self organizing communication for bait detection scheme. The method identified the black hole nodes and generated the preventive communication route. The self organized structure has provided the network estimation under dynamic constraints so that the reliable network communication will be formed. Atishkumar et. al.[15] has discussed the Communication features under application driven Underwater Sensor Network. The mobility and dynamic aspects along with secure routing method was provided by the author. The Communication infrastructure inclusion and threat specific communication optimization was suggested by the author. A key pair specific handshaking method was provided to identify different attacks and to provide the safe network communication. Author identified the open communication issues and generated the safe communication route in the network.

III. COMMUNICATION CHALLENGES AND REQUIREMENTS

The dynamic Underwater Sensor Network provides the distributed communication and resource allocation and utilization in open network. The application driven requirement analysis and constraint specification is required. The configuration setup as well as to provide the process level communication so that the optimized network communication will be performed. The network is defined with specification various integrated Communication constraints and challenges. In this section of the associated Underwater Sensor Network challenges and Communication requirements are discussed.

A) Network Attacks

Underwater Sensor Network potentially available in open space so that any existing and new user can participate to the network. The multiple hop communication also includes the intruders as the intermediate node. Because of this, there is the requirement to observe the network connectivity under the layered phenomenon and with specification of Communication constraints. The distributed protocol in the hostile environment can be defined to provide the cooperative network communication so that the safety against various network disruption will be obtained. The network also suffers from different attacks applied by internal and external nodes. The functionality analysis and the packet level analysis are required to provide the safe network communication. The message driven analysis and provides the route specific observation. Some of the common attacks include black hole attack, packet forwarding attack, wormhole attacks etc. These attacks generally disrupt the communication and increase the communication loss.

B) Service Level Challenges

As the network is distributed in the larger network space with specification of large number of network nodes, because of this, there is the requirement to compose the network services in the global environment. The effective service allocation and the service delay is also the challenge for the network based on the service type, application specification, the load on the network increases. This increased network load also increases the communication delay in the hybrid network environment. Because of this there is the requirement of some aspect specific communication measures so that the adaptive network communication will be formed. The QoS reduction is the Communication generated criticality in the Underwater Sensor Network.

B) Heavy Traffic

The major aspects of the network are to provide the communication analysis at the switch level and at transportation level. The data forwarding and the communication across the network is also provided. The traditional parameters observation is defined to identify the

neighbor nodes if the multiple hop based communication is defined. In such case, the hop specific routing decision can be taken. The shortest path estimation and the border gateway specific protocol map can be defined to generate the communication. The communication strength observation with routing protocol specification is here defined in the switched network to control the latency and the traffic control. The connection modeling and the framework driven communication can be applied. The architecture of the communication can be established for effective communication traffic control so that the safe and the absolute communication will be drawn. The traffic control method with specification of relative data parameters is also defined with forwarding decision so that the controlled communication in switch network will be obtained.

C) Dynamic Route Formation

The route formulation in the Underwater Sensor Network can be done by checking the network connectivity and to provide the layered mechanism to provide the periodic formulation link. The neighbor node analysis and the periodic estimation of the network are provided to generate the optimized network pat. The link estimation and the failure estimation are the key terms to provide the safe communication over the network. The route repair method is here suggested to achieve the link repair specification so that the communication hop driven route discovery is provided. The alternate route formulation and route discovery is here done to improve the network effectiveness. The invalid data communication and the link failure robust communication are required in such networks.

IV. CONCLUSION

Underwater Sensor Network is the dynamic public area network that suffers from various network challenges. This paper is focused on Communication challenges. The Communication aspect defined here includes against different criticalities including the attacks, service level communication. The paper has identified these challenges under different aspects including the protocol level, layer specific etc.

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