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Dynamic Re-Configuration Algorithm for Node Mobility Prediction to Rescuer from Link Failures

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Abstract: Node failures in WSN will reduce the performance of network traffic, which effect the functioning on the whole network. We propose aDRS algorithm, which accuractly detects the node failure in real time network; Italso re-configures the network structure dynamically using a re-configuration plan, for better communication within a network. The algorithm implementation is simulated in NS-2 and the accuracy is tested using 50 nodes. It is shown that 95% accurate in deploying and routing in a re-configuration plan of a failed node.

Key words: Re-configuration · Mesh · Failures · Re-routing

INTRODUCTION

Wireless Dynamic mesh networks (WDMNs) will be created in numerous forms with the help of multi-level radio systems with the increasing demands and capacity in serving various applications in safe to the public, via wireless Internet services world wide and different types of real time applications too.

This has created challenging problems in maintaning the performance of the network, with certain fluctuating failures and conditions link failures occur in real time.

Need for Dynamic Reconfiguration:

Failures occur in dynamic and distributed links in wireless network
Detection of the failures occur in links
Re-configuration link failure

Back Ground: Wang (2002), stated and implemented an application for safe monitoring of network within a city limit for monitoring the traffic [1].

(Akyildiz& Wang 2002) to meetthe increasing capacity demands by a variety of applications such as public safety, environment monitoring, city-wide wireless Internet services and other emerging applications [2].

Nandagopal (2005), Theoreticall states the preset network configuration planner to network reconfiguration [3].

Neelakuditi (2005), developeda fault-tolerant protocol on multipath routing in a local area network [4].

Nahrstedt (1999), developed a wireless node probing technique for condition planning [5].

Raniwala (2005) implemented a technique name greedy channel algorithm to makes changes to the failure recovery in a node [6].

Motivation:

Quality Link Failure Recovery
Demand for QOS solution
Restoring The Availability of Heterogeneous channel
Network model and assumptions

The Drs –Protocol Design: DRS- Dynamic system which can be deployable on IEEE802.11 based Dynamic mesh networks. DRS will provide re-configuration plans for channel assignment automatically and dynamically.

A Re-configuration plan uses number of links and channels required on a network for recovering a link failure occurs in a channel with safe Quos. It also can re-configure multiple links failures and recovery using this plan.DRS is a re-configurable system which has the following features

Plan of Localized: DRS – prepares a plan in re-configuration of a network link failures in the area of remote and local

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Plan for QoS-aware: DRS prepares an

- Effective cost- reconfiguration plan
- Benefit of the channel utilization
- Estimation of reconfiguration plan using Qos

Failure and Fault detection and Link Monitoring – DRS it supervises the accuracy of nodes in a link which are distributed. It also identifes the link failure of nodes in realtime. Checks the Qos constraints of the link.

Link quality monitoring and fault detection: DRS accurately monitorsthe quality of links of each node in a distributed manner. Furthermore, based on the measurements,and detects local link failures in real-time.

Plan for Cross Layering: DRS interacts with various layers of network protocols for routing, recoverying the node links, preparing rerouting using re-configuration plan.

Cross Layer Planning: DRS interact with the networks and use links for planning. This enables DRS to extend the connectivity between routing protocols and re-routing the connection at the time of recovery using plan of re-configuration.

DRS Architecture: The block diagram of DRS in Figure 1, shows DRS can incarcerate and transfer the packets in a group as a hook. The following are the modules in Manager Group, update failure, monitor group.

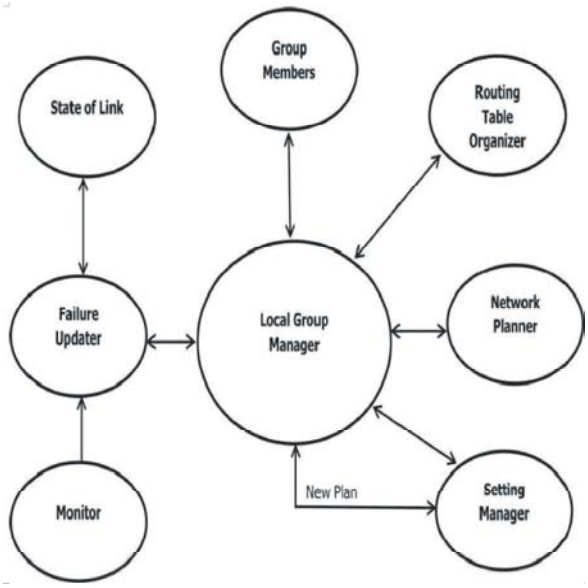

Fig. 1: Drs-Architecture

Manager Group: It creates a Dynamic Mesh routers amoung group

Updater Failure: It monitor the network wrt time and update the link state of each line between nodes in the table

Table Routing: DRS updates the states of routing table.

Monitor: It quickly check the quality of links in multi-level channel and support the links

Manager- Settings: Effectively sets the setting of NIC based on Reconfiguration plan for the organising a group

Network Setter: It has a plan generator for preparing a new plan in setting up the bandwith required for Qos.

Steps of Drs Algorithm

DRS algorithm is categories into 4 parts
Time Monitoring
Failure detection in a group
ReconfigurationPlan period.
DRS Operation at Dynamic mesh node

(1) Time Monitoring

Repeat for each link do

Check the quality of link using passive

end for

Transfer the result to the gateway;

(2) Failure detection in a group

Check the requirement of violates link
Then make a request in a group for link channel
End if

Involve in lead when a request is received of selected.

(3) Time Planning

Check for selected node as a lead **then recoup a request message of planning to the gateway**

Else if gateway itself is the node
Then

Do Re-configuration from requests of synchronization, prepare a reconfiguration plan
Repeatedly send a reconfiguration plan to a lead of;
End if

(4)Reconfiguration plan period
Check for node changes then
Effect the link changes
Endive
Link to the nodes of neighbors any if

Time Monitoring: Here the monitoring of outgoing and incoming links is checked dynamically in a mesh network. The check is done on the link quality based on threshold i.e. for good or bad threshold, if the link quality is below the threshold it is treated as bad or failed. When failure occurs in a link group formation is done dynamically or group process starts.

Failure Detection in a Group: Here, the failure links form a group and then identification of the lead node from the group is done by comparison the energy function of each node. Then the lead node generates a plan message and transfers the message to the gateway.

Periodic Planning: The output of the previous stage received to the gateway, is compared with other requests received to the gateway. Then the gateway prepares a re-configuration plan based on the requests of the failures occurred in the network.

Then the gateway prepares a synchronization process for re-configuration.

Plan Period of Reconfiguration: In this, A Lead node will receive a reconfiguration plan from the gateway and then the lead node re-sends the plan to the group of nodes. Then the group of nodes changes the setting of link between nodes based on re-configuration plan, similarly the plan is forwarded to other node neighbors.

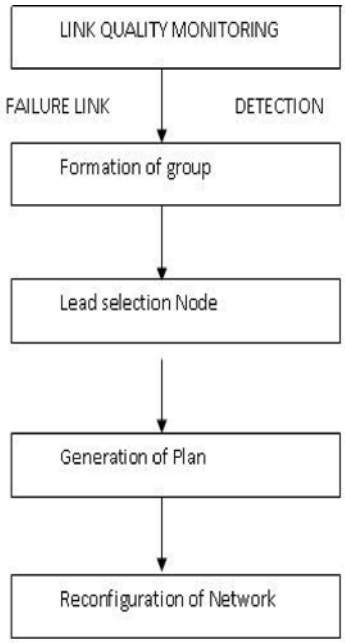

Fig. 2: System Flow of DRS Algorithm

RESULTS AND DISCUSSION

DRS routing is simulated using NS-2.3 simulator, in this study, we have shown simulation of various stages for implementing of Dynamic re-configuration System and its analysis.

The parameters used for evaluation are shown below. We have taken 50 nodes of Dynamic mesh topology are created.

- Reconfiguration Network
- Generation of Feasible Plan
- quality Link monitoring
- Planning Cross layer
- Dynamic Reconfiguration.

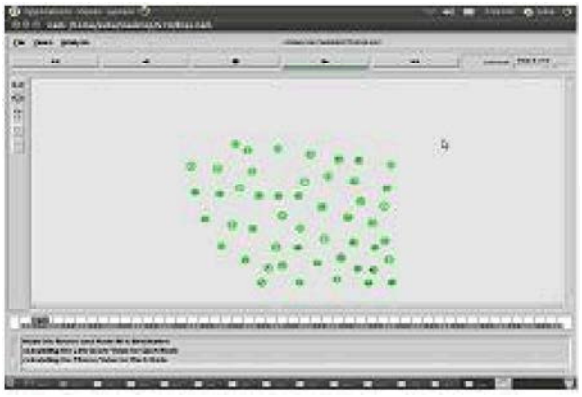

Fig. 3: Environment Simulation

Fig. 4: Feasible Plan generation

Environment Simulation: We have chosen nodes 50 with dynamic grid based topology of axis X and axis Y 1200 x 1200 square meters. The Figure shows the model of propogation.

Fig. 5: Link Quality monitoring

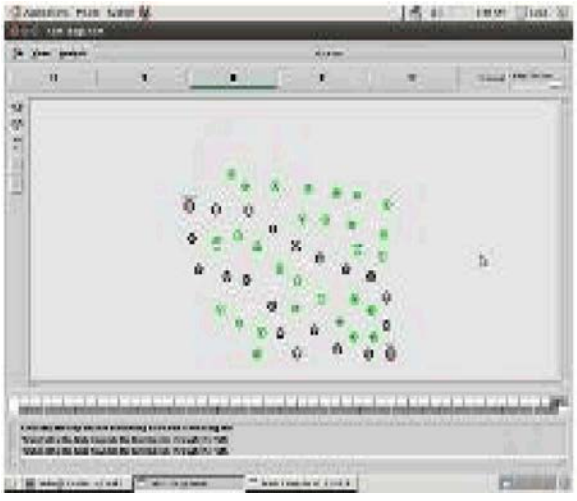

Fig. 6: Cross Layer Interaction

Dynamic Reconfiguration: With the avialability of multiple channels, DSR prepares a Re-configuration plan, which allows setup a network dynamically only for the link node failures and remote node failures is shown in Figure the realted assocate.

Plan of Feaibility: Figure 4, above shows theplan of Feasible. The plan searchs for link failure, changes in the link and the fault area. DSR will identify and avoid faults occur in existing network.

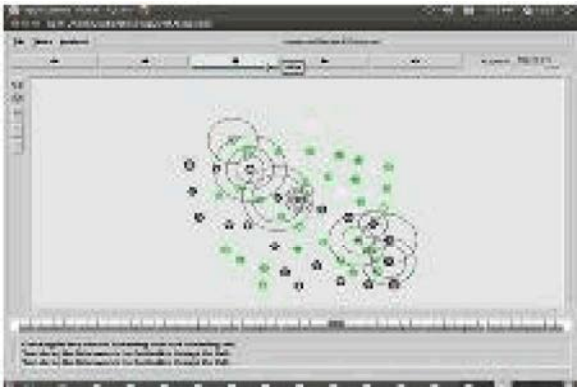

Fig. 7: Dynamic Reconfiguration

Link Quality Monitoring: Figure 5, above show the environment of simulation for monitoring the quality. DRS will accurately monitor the link quality and identify the failure of links associated and will automatically reconfigure the network configuration when failed.

Cross Layer Interaction: Figure 6, above gives the layered interaction of cross section in a network arbitary. DRS actively interact across the network and link layers for planning. This DSR will re-route the network configuration when a failed node is occurred in a group, by selecting the lead.

Autonomous Reconfiguration: Figure 7, above shows the automatic implementation of path generation and detection and link failure. The DRS algorithm will prepare a group, plan, re-routine the group and does network re-configuration.

CONCLUSION

Dynamic Re-configuration System (DRS) enables the wireless network to dynamically recuperate from link failure. It prepares a re-configuration using local network channel for configuration the path of network. DRS Accuratly prepares a re-configuration plan of action for an

application based on Qos. The DSR design has been analyzed using Software NS-2.3. Future DRS systems can be configured in a cloud network for better and accuracy communication in various media's of Wireless communication.

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