# ITU-T Kaleidoscope 2010 Beyond the Internet? - Innovations for future networks and services

Performance Comparison of Intelligent Jamming In RF (Physical) LAYER with WLAN Ethernet Router and WLAN Ethernet Bridge

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#### **Outline**

- Introduction
- Security issue in intelligent network
- Objectives of Research
- Methodology
- Simulation Results and Discussion
- Conclusion
- References

#### Introduction

- Security has become a primary concern in order to provide protected communication in Wireless as well as wired environment.
- In the presence of jammer which router is more secure at RF Physical layer?

# Security issue in intelligent network

- Jamming is any attack to deny service to legitimate users by generating noise or fake protocol packets or legitimate packets but with spurious timing.
- Jammer can choose to disrupt selected control packets for a very short time and bring down the whole network.

### **Objectives of Research**

- To demonstrate the Comparison of Intelligent Jamming in RF (Physical) Layer with WLAN Ethernet Router and WLAN Ethernet Bridge
- Or
- A design goal was to analyze the performance and Jamming Comparison with WLAN Ethernet Router and WLAN Ethernet Bridge

# Methodology

#### Simulation Tool

The simulation software used in this Report is the OPNET MODELER version 10.0. and 14.0 The simulation of the OPNET Modeler will be performed on a Pentium IV system with 2.4 GHz CPU and with 512 MB RAM.

#### Computer Environment

OPNET Modeler is compatible for Window environment.

#### Mobility Model

OPNET simulations are based on four separate modeling domains called Network, Node, Process, and Link illustrates.

### **Simulation Results and Discussions**

#### **Performance Metrics**

Throughput

Media access delay (sec)

Down load response

Average end-to-end delay

# This scenario is contains with jammer, and there are ten number of stations

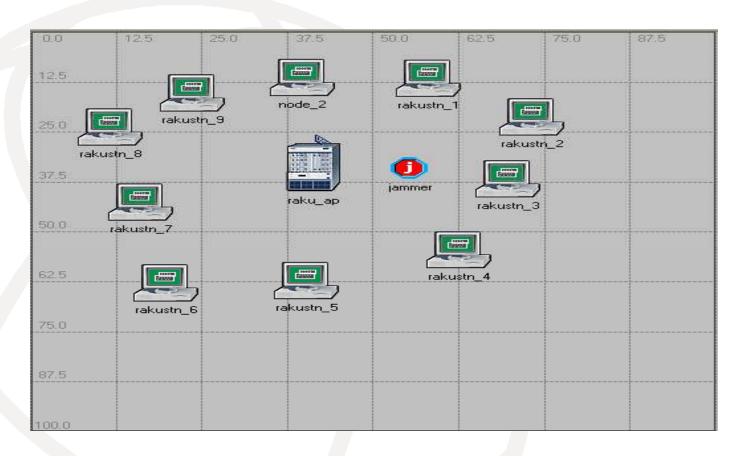


Figure 1: Jammer model with WLAN Ethernet Router

# This scenario contains with jammer, WLAN Ethernet Bridge (AP) and there are ten number of stations

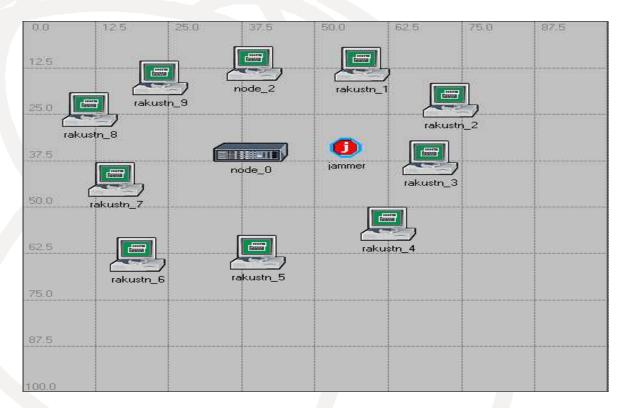


Figure 2: Jammer model with WLAN Ethernet bridge

# This scenario contains without jammer, WLAN Ethernet Router (AP) and there are ten number of station

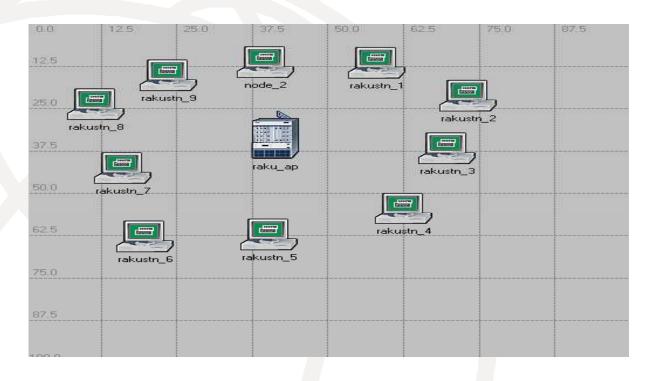


Figure3: Jammer model with WLAN Ethernet Router

# This scenario contains without jammer, WLAN Ethernet Bridge (AP) and there are ten number of stations.

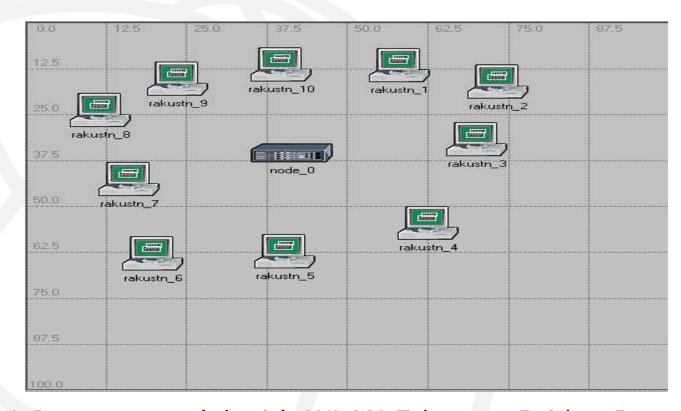


Figure 4: Jammer model with WLAN Ethernet Bridge Router

#### **Jammer Attributes**

Attribute	Value
Model	Jammer_pulsed_advanced
Altitude	10
Jammer band base	2.402(MHz)
frequency	
Jammer bandwidth	1 Mbps
Jammer	0.001(Watts)
transmitted power	
Pulse width	0.001
Silence width	1

#### TABLE .1

#### **Throughput (Bits/Sec)**

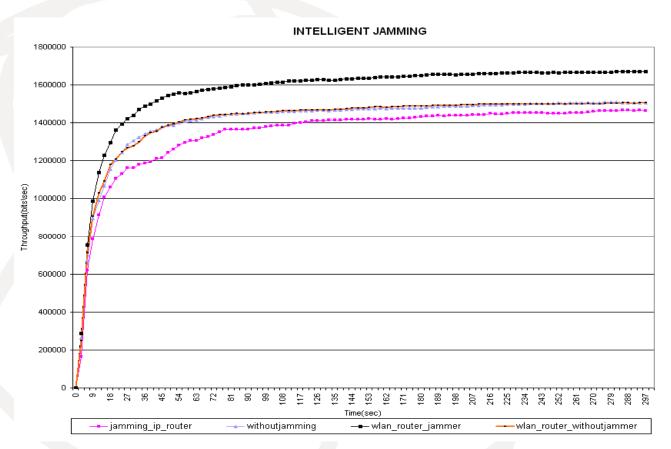


Figure 5: Comparison of average throughput of different scenario in case of Jammer and without jammer

#### **Observations**

- We have seen from Figure 5. The throughput is highly affected in the case of WLAN Ethernet Router (APs) here the value is 1465307(Bit/sec), but in case of WLAN Ethernet Bridge (APs) the value is 1671790(Bit/sec) and
- In other two cases when jammer is not presents then the throughput is same i.e 1505200(Bit/sec). So we have judged that jamming is active in this environment.

# Media access delay (sec)

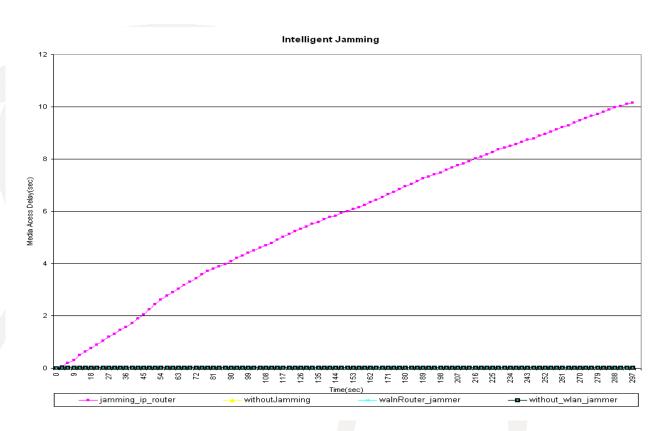


Figure 6: Comparison of average Media access delay of different scenario in case of Jammer and without jammer.

#### **Observations**

Now from Figure 6. Jammer with the Media Access Delay (sec) is near about 10.15(sec) and in other case it is near about zero. This shows that jammer with WLAN Ethernet Router (APs) is highly affected.

# Load (Bits/Sec)

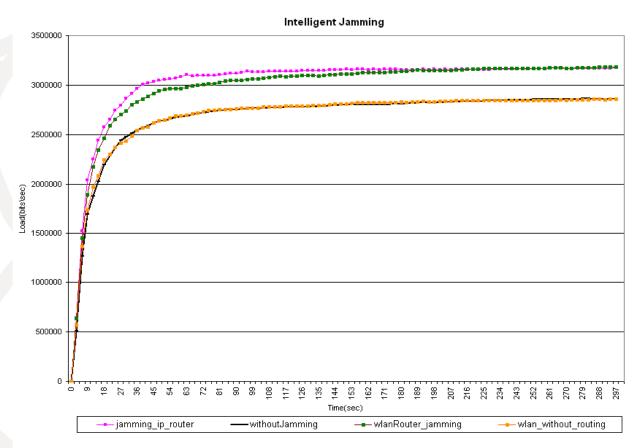


Figure 7: Comparison of average load of different scenario in case of Jammer and without jammer

#### **Observations**

- We have referred Figure 7. When we will compare Load in the case of WLAN Ethernet Router and WLAN Ethernet Bridge. In the presence of jammer load is higher than without jammer.
- So we conclude that jammer disrupt the Communication. From simulation result the load with jammer is 3181181(Bit/sec) and without jammer is 2856016(Bit/sec).

### **Data Dropped At Station**

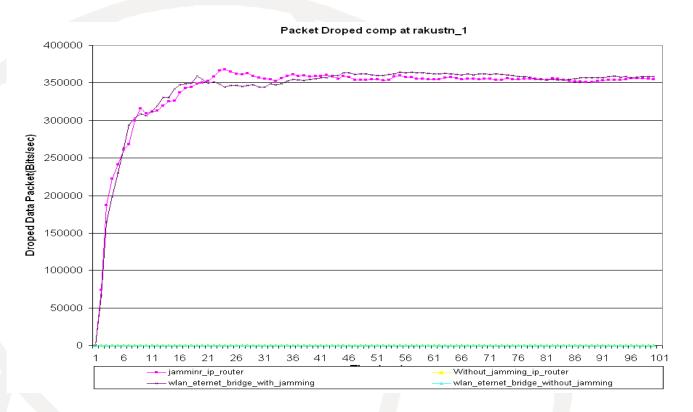


Figure 8: Comparison of average Dropped Data Packet of different scenario in case of Jammer and without jammer

#### **Observations**

At last from Figure 8. The data dropped status on particular station (rakustn). We have observed that in case of WLAN Ethernet Router (APs) and WLAN Ethernet Bridge (APs) with Jammer have dropped data packet are very high but in the case of without jammer dropped is zero.

#### **Conclusion**

- In this paper we have seen the performance of router under the influence of jamming, that can be launched in an access point based 802.11b.Our network is consist with WLAN Ethernet Router (APs) and jammer which is highly affected RF (Physical Layer). We had two observation in this research and I am giving both observation in case wise observation.
- Case: 1 Jammer is highly affected in the network. When we have referred our results we have observed that dropped data packet, load, and Media access delay all result was showing that jammer is highly affected in the Network.
- Case :2 When we were compared all the result scenario wise we have concluded that if we will use WLAN Ethernet Bridge at the place of WLAN Ethernet router the influence of jamming attack can minimize and throughput can increase.

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# THANK YOU!!!