

Power Efficient Circuits for Intrusion Detection using Memristor Crossbars

VenkataRamesh Bontupalli, Raqibul Hasan

Tarek Taha

Intrusion Detection System (IDS)

A device or software that offers cyber security
Discovery of invasions and attacks
Performing Deep Packet inspection techniques
Types of IDS based on target of monitoring

Host Based IDS

Network Based IDS

Types of IDS based on Detection

Signature Based IDS

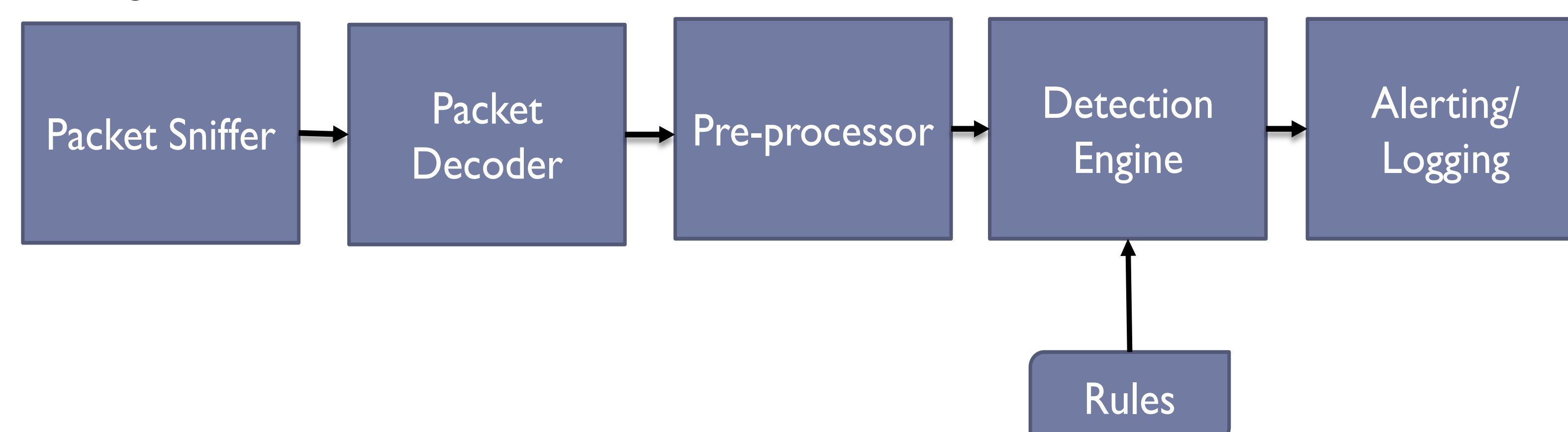
Anomaly Based IDS

Snort

Powerful and popular network IDS
Free and open source software.
Supported by wide range of rules
Ability to perform Deep Packet inspection
Real time traffic analysis on networks.

Modes

- *Sniffer*
- *Packet Logger*
- *Network intrusion detection*

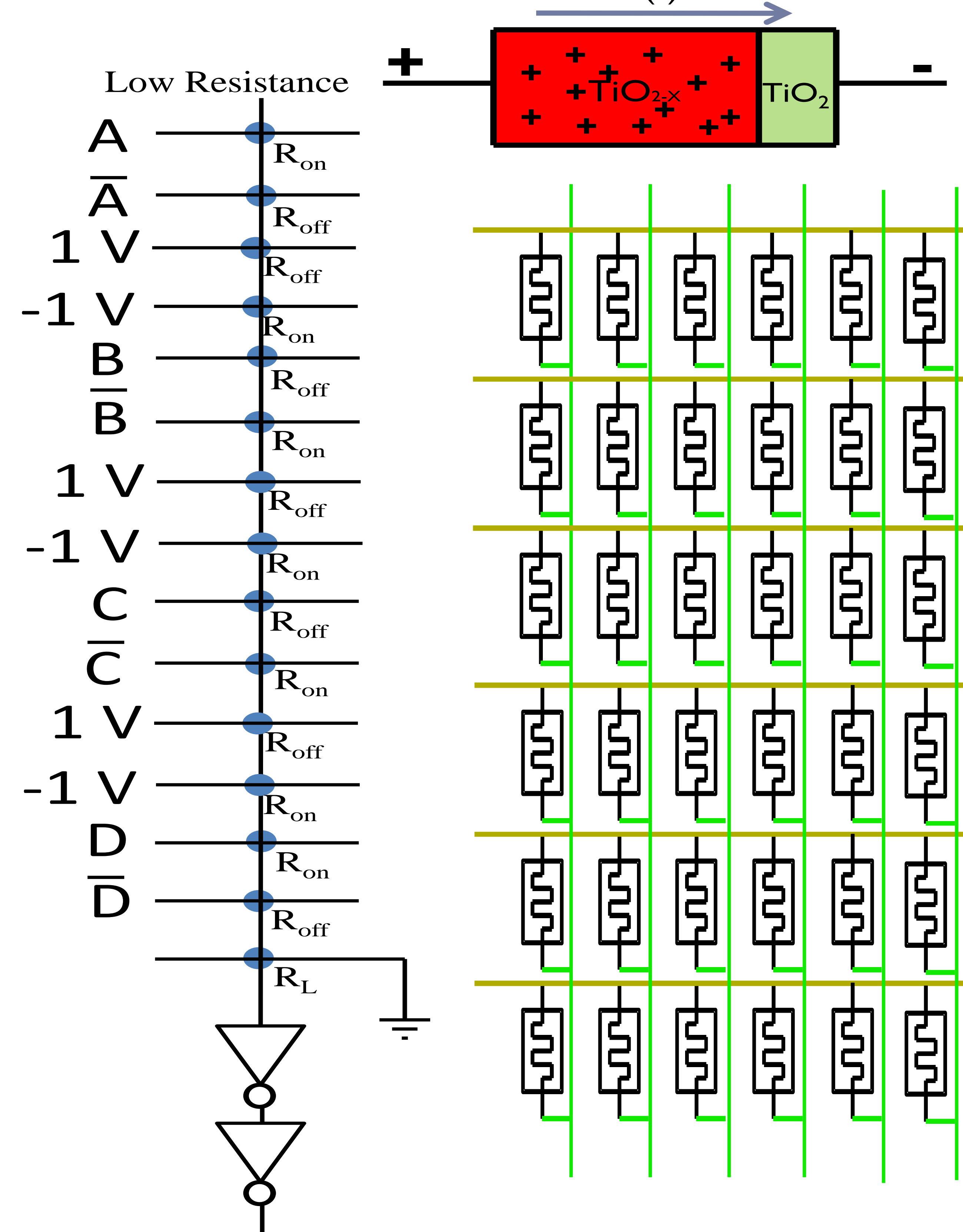
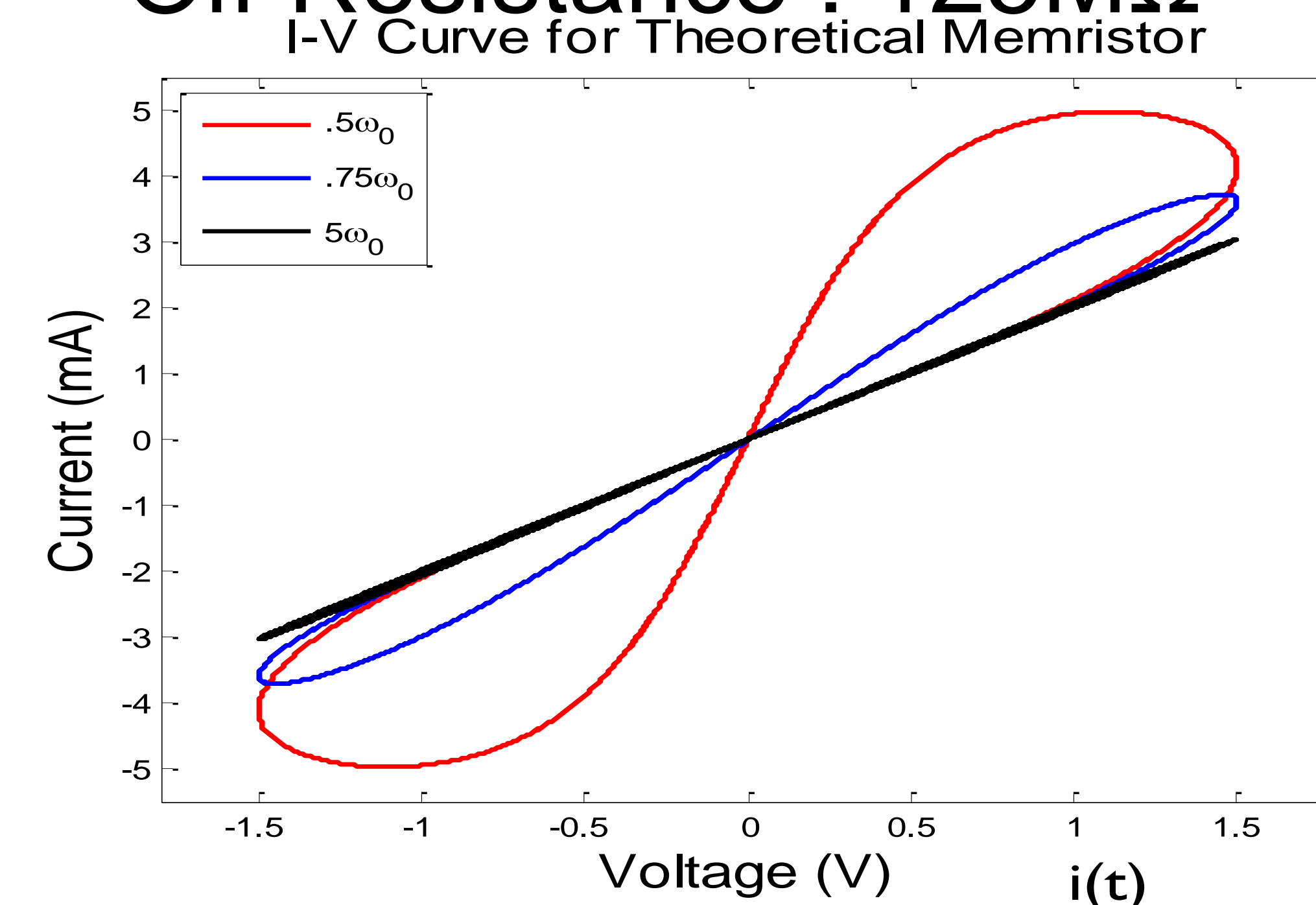


Snort rule contain rule header and rule option

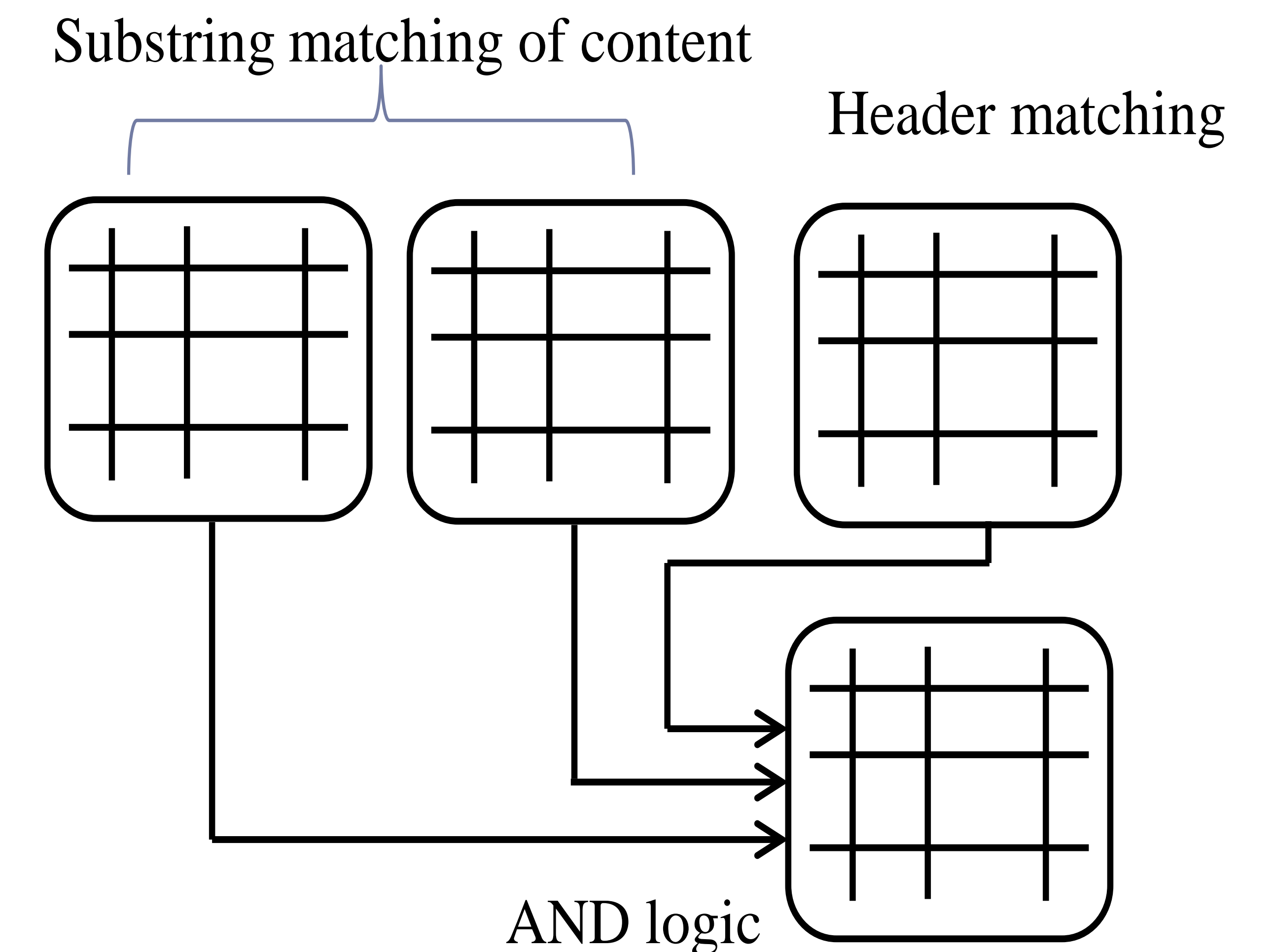
Rule Header :	Rule Options:
Syntax before the parenthesis	Syntax Enclosed within parenthesis

The Memristor

Nanoscale non-volatile device
Large varying resistance range
On Resistance : 125K Ω
Off Resistance : 125M Ω



Architecture for SNORT IDS



Results

System/ Parameter	Memristor crossbar	Intel E8400
Area (mm ²)	2.02E-02	107
Power (W)	4.11E-04	65
Throughput(Mbps)	408	15.7

Conclusion

Intrusion Detection is done at
Extreme low power about 150K times power efficiency of Intel processor.
Consumes very little area for desired string matching task
Obtained better throughput than traditional architectures
Can be widely used in power limited devices like mobiles etc.