Project **IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**

Title **Presentation for Generalizing 4IPP Traffic Model for IEEE 802.16.3**

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Re: This presentation is associated with contribution IEEE 802.16.3c-00/58 submitted in response to call for contribution, from IEEE 802.16.3 Traffic Model Ad-hoc Committee, sent out 2000-11-21, with a subject of IEEE 802.16.3c-00/51 (4IPP Model).

Abstract The contribution defines a generic traffic model – n Interrupted Renew Process (nIRP), it provides both self-similar traffic and non-self-similar traffic modeling for Broadband Wireless Access (BWA) applications. The model can be used to accurately characterize measured voice, video and data traffic. It is a backward compatible extension of 4IPP model. It is forward extendable as well. The contribution offers a system level method suitable for simulation of MAC/PHY proposals from traffic and performance perspectives.

Purpose For 802.16.3 to consider the input of the nIRP model for evaluating different MAC/PHY combinations. This contribution is made for Session #11 in Ottawa.

Generalizing 4IPP Traffic Model for IEEE802.16.3

Presentation for IEEE802.16.3 meeting #11 at Ottawa
of http://ieee802.org/16/tg3/contrib/802163c-00_58.pdf

Jun Huang
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What is the issue?

- TG3 Systems will see a different traffic mix as compared to TG1:
  - **IP** traffic will dominate as opposed to TDM traffic.
  - Support **large** number of relatively low bit rate bursty sources.
- Implication: The model should be able to easily handle a **wide** range of burstiness in terms of packet inter-arrival time and packet size.

- *Ref: IEEE802.16.3p-00/56 Using the TG1 MAC for TG3 purposes .*

Requirements for Traffic Model

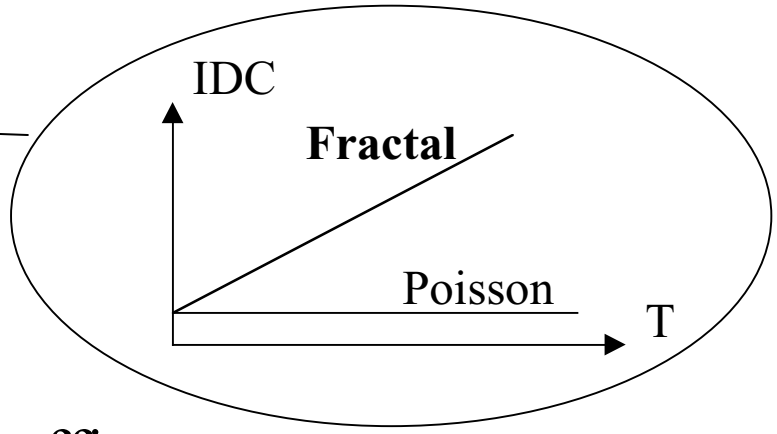
- Parsimonious — less number of parameters to match measurements.
- Analytical — solvable when fed into queuing models.
- Relative accurate — good enough for MAC comparison simulations.
- Flexible — one model but lots of variants for different applications.
- Implemental — less time consuming for simulation (code-dev./run-time).
- Absolute accurate — critical for business case studies.

Available Traffic Models

	FBM	TCP	4IPP
Pars.	✓ ✓	✗	✓
Anal.	✗	✗	✓
Flex.	✗	✗	✓
Impl.	✓	✗	✓
Accur.	✓	✓ ✓	✓

Existing IEEE802.3 Model

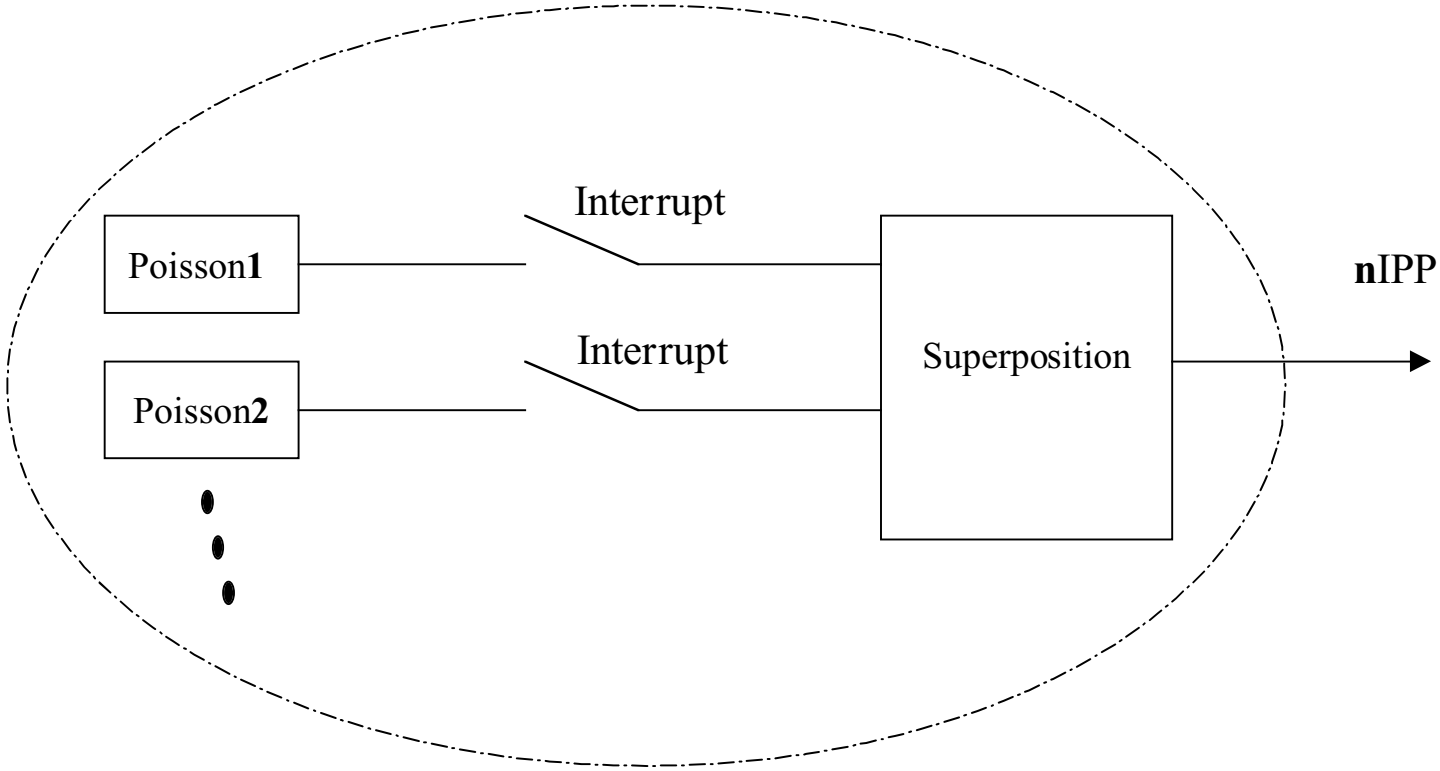
- Is able to handle large number of aggregated data traffic:
  - —Inter-LAN.
  - —Self-similar.
- Need to be extended to address:
  - —Single home user.
  - —Non-self-similar traffic.
  - —More upcoming multimedia traffic.
- Minor extension of the existing model will do.



- *Ref: IEEE802.16.3c-00/51 4IPP Traffic Model for IEEE8 02.16.3 .*

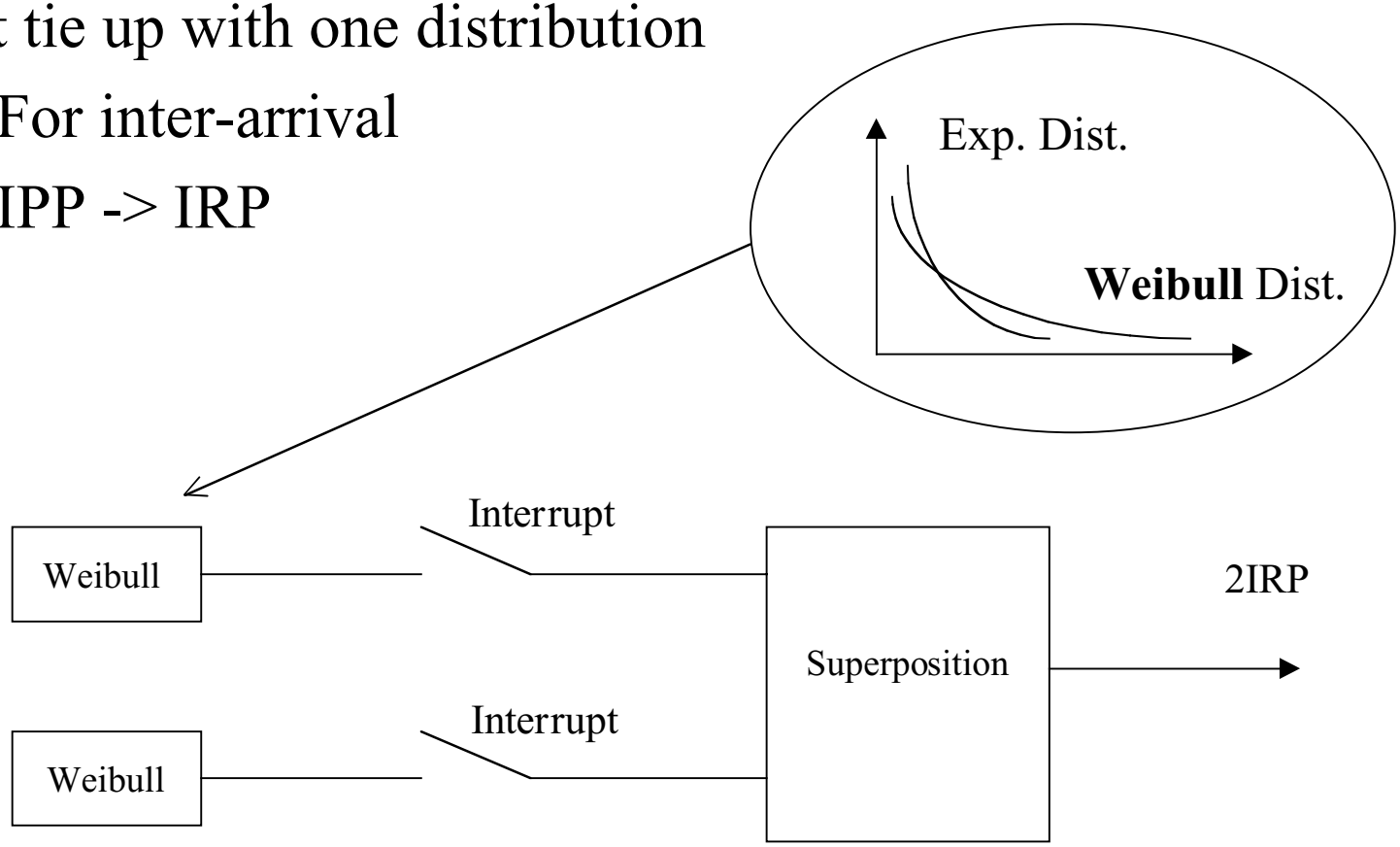
Just varying the s ize

- Not tie up with a number
  - —4-IPP -> n-IPP



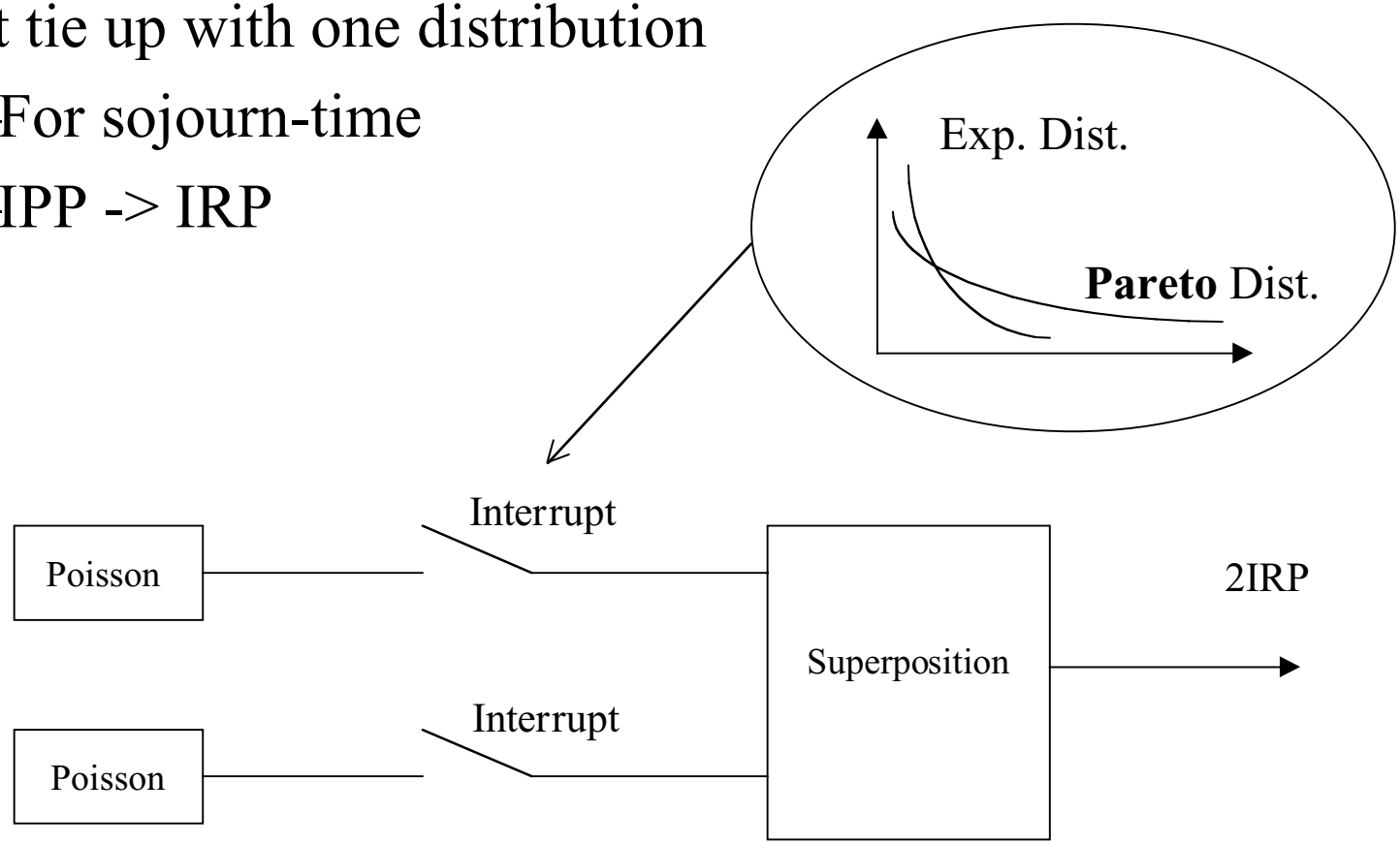
Shrinking or Extending inter-arrival

- Not tie up with one distribution
  - —For inter-arrival
  - —IPP -> IRP



Stretching sojourning-time

- Not tie up with one distribution
  - —For sojourn-time
  - —IPP -> IRP



Simulation method

n	Inter-arrival	Sojourning	Well-know Models
4	*Exponential*	*Exponential*	4IPP
1	*Constant*	*Pareto*	Pareto On-Off
1	*Weibull*	*Pareto*	WWW
1	*Constant*	*Exponential*	On-Off
1	*Exponential*	*Pareto*	Pareto IPP
16	*Constant*	*Exponential*	Mini On-Off

All in One approach

Next Steps

- More extensions
  - —Batch Poisson version extension
  - —Packet size version extension
- Run simulations
  - —Your inputs:
    - What do YOU want to simulate?

Enjoy your stay in Ottawa