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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.

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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
Jan 22/ 2001

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:

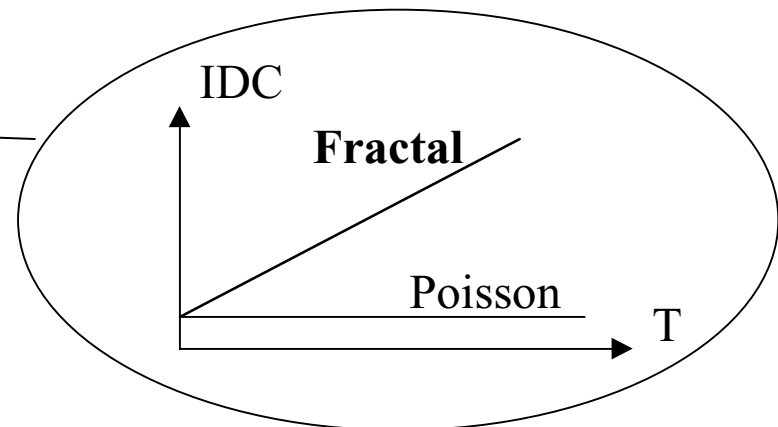
—Single home user.

—Non-self-similar traffic.

—More upcoming multimedia traffic.

¥ Minor extension of the existing model will do.

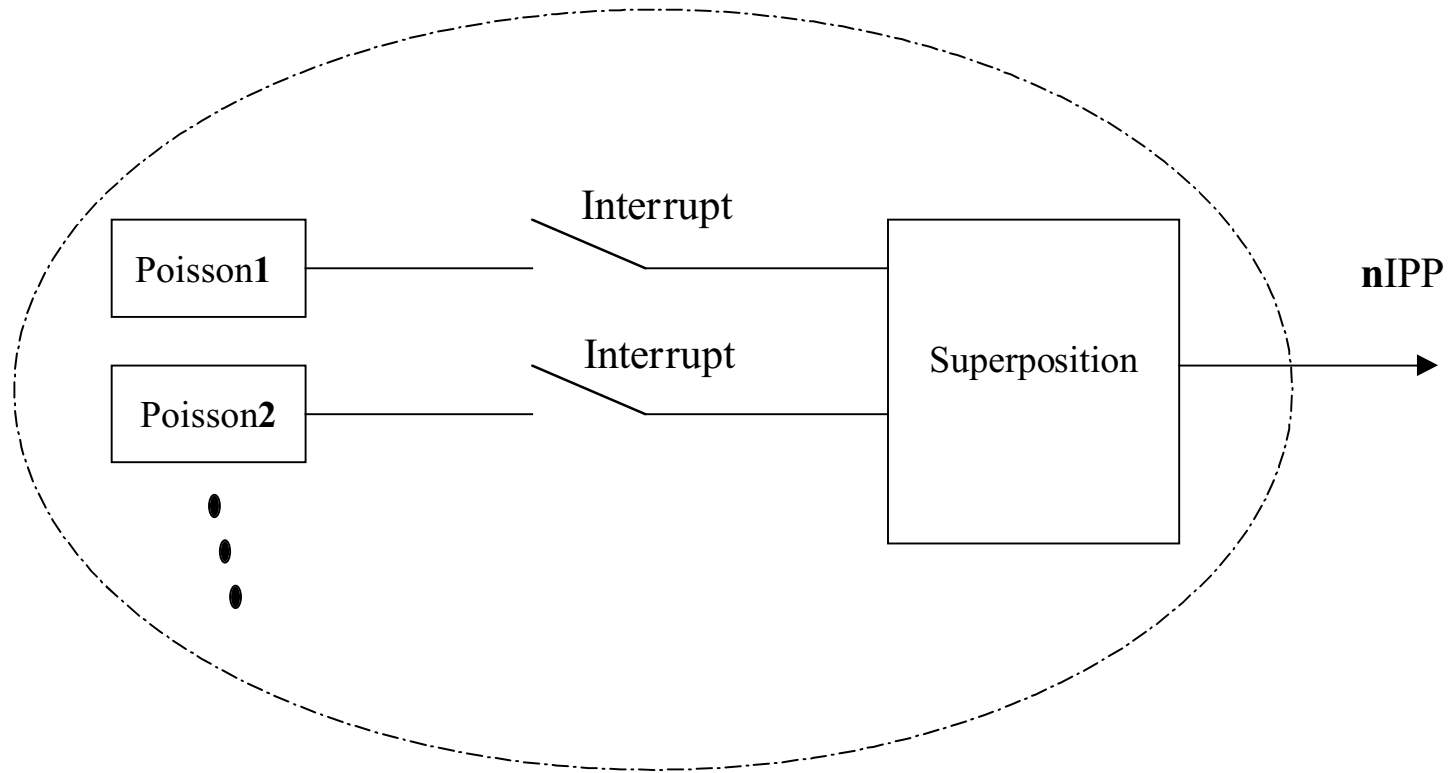
¥ *Ref: IEEE802.16.3c-00/51 4IPP Traffic Model for IEEE8 02.16.3 .*



Just varying the size

∄ Not tie up with a number

—4-IPP -> n-IPP

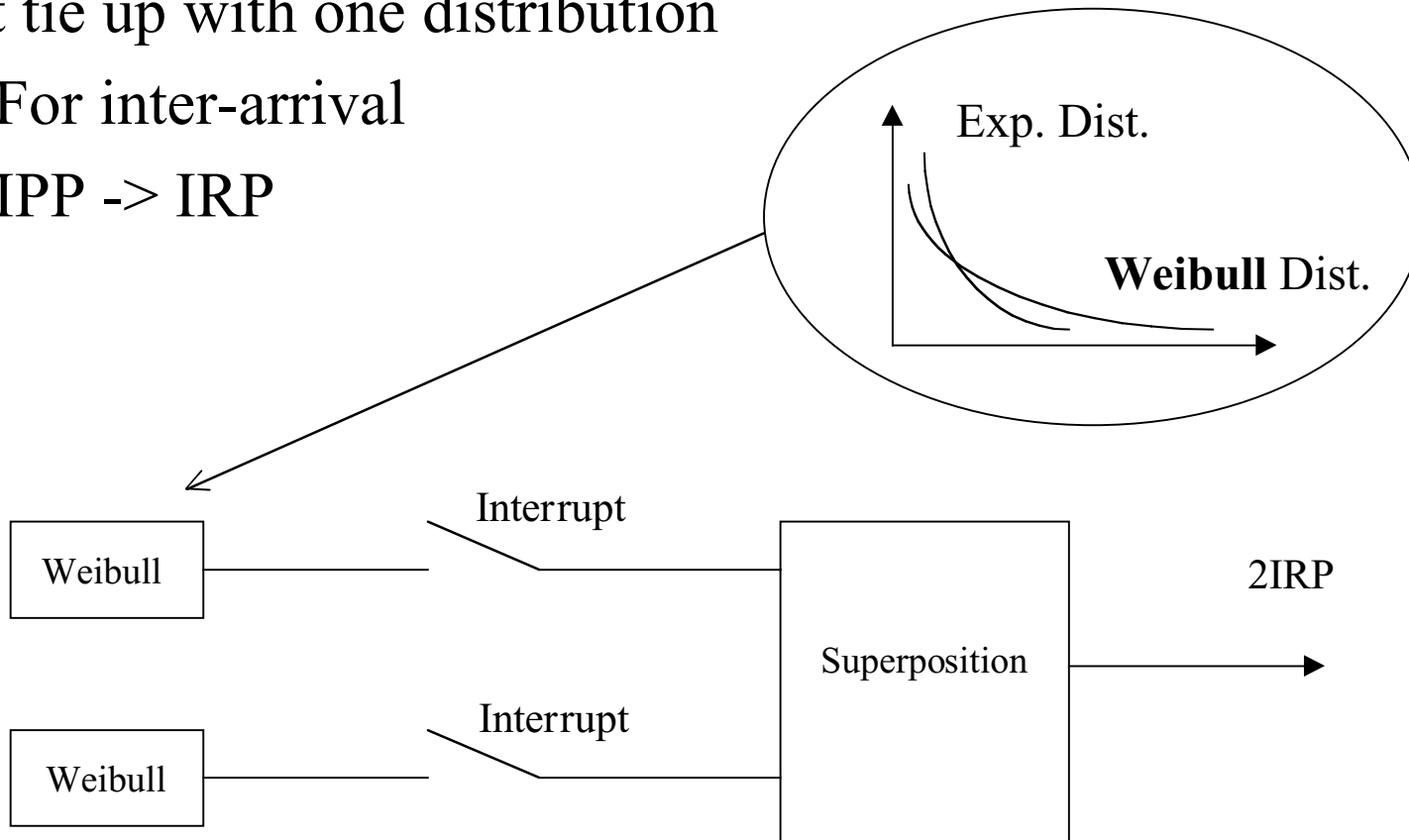


Shrinking or Extending inter-arrival

∄ Not tie up with one distribution

—For inter-arrival

—IPP \rightarrow IRP

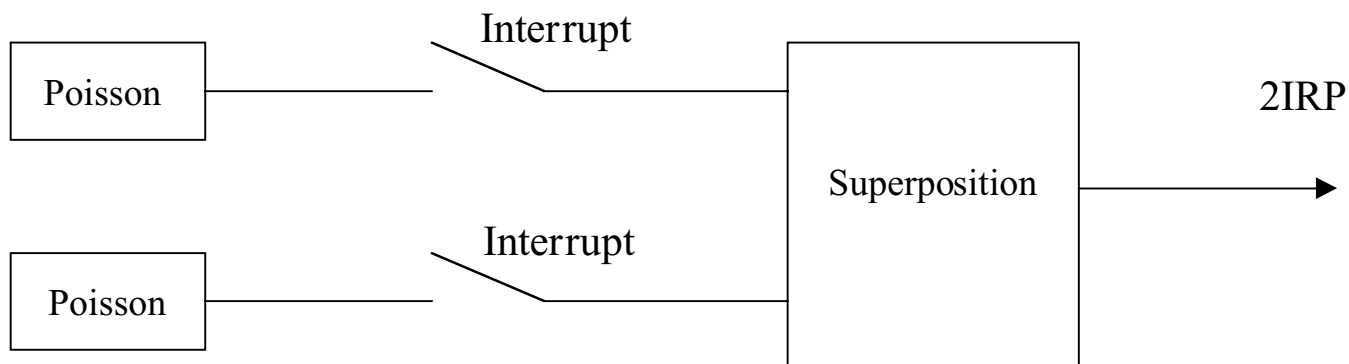
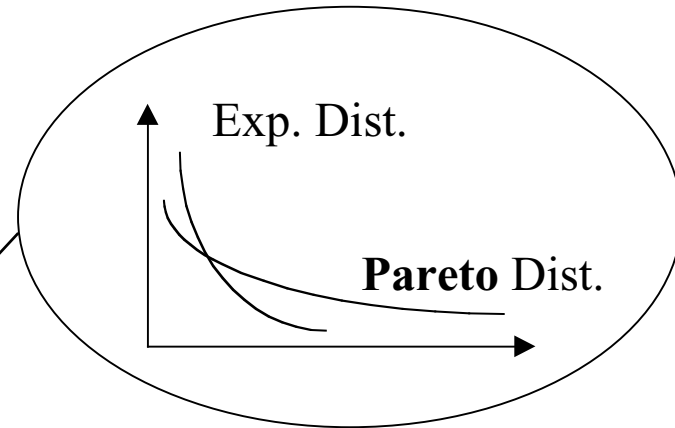


Stretching sojourning-time

∄ Not tie up with one distribution

—For sojourn-time

—IPP \rightarrow IRP



Simulation method

n	Inter-arrival	Sojourning	Well-know Models
4	<i>Exponential</i>	<i>Exponential</i>	4IPP
1	<i>Constant</i>	<i>Pareto</i>	Pareto On-Off
1	<i>Weibull</i>	<i>Pareto</i>	WWW
1	<i>Constant</i>	<i>Exponential</i>	On-Off
1	<i>Exponential</i>	<i>Pareto</i>	Pareto IPP
16	<i>Constant</i>	<i>Exponential</i>	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