

Integration of Synchronous and Asynchronous Traffic in Residential Ethernet

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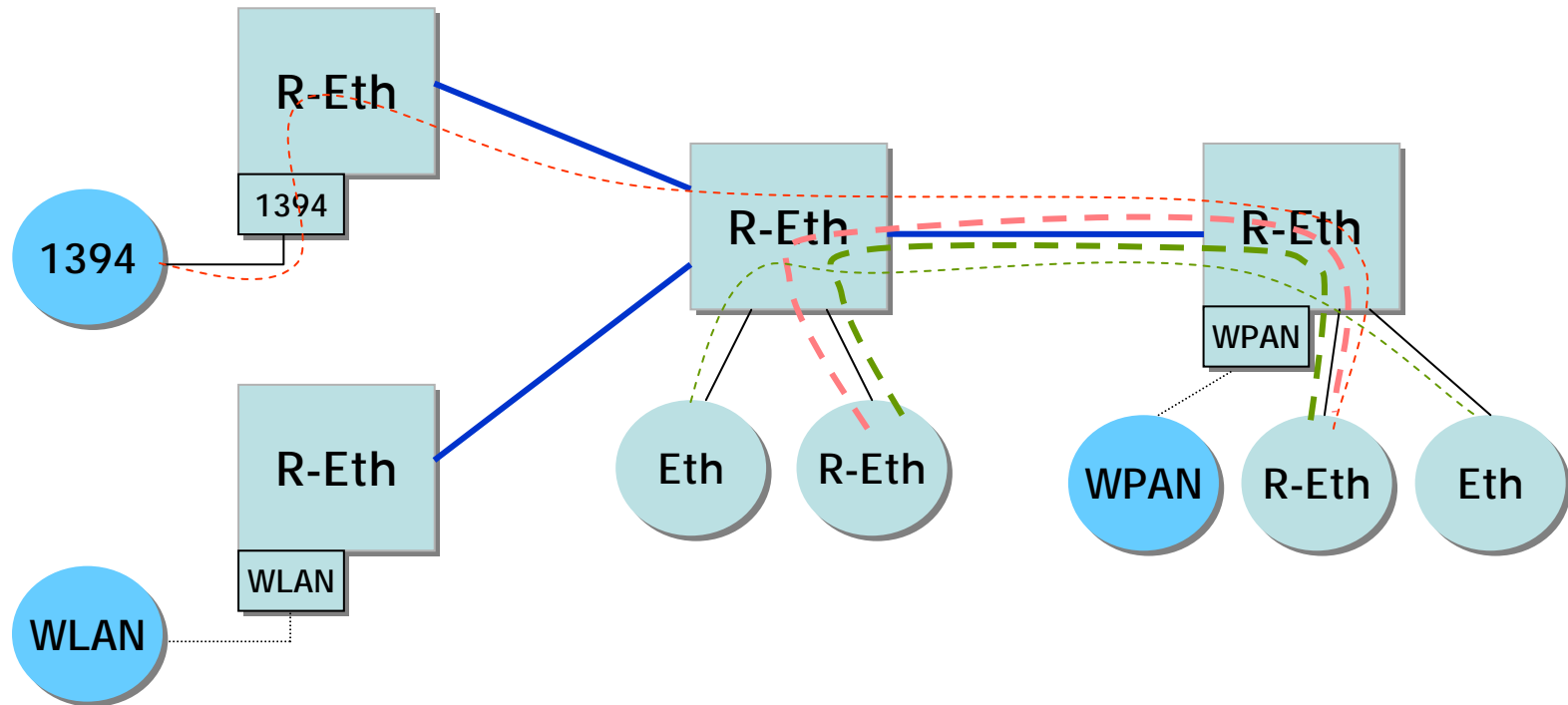
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Residential Ethernet as a Backbone (I)

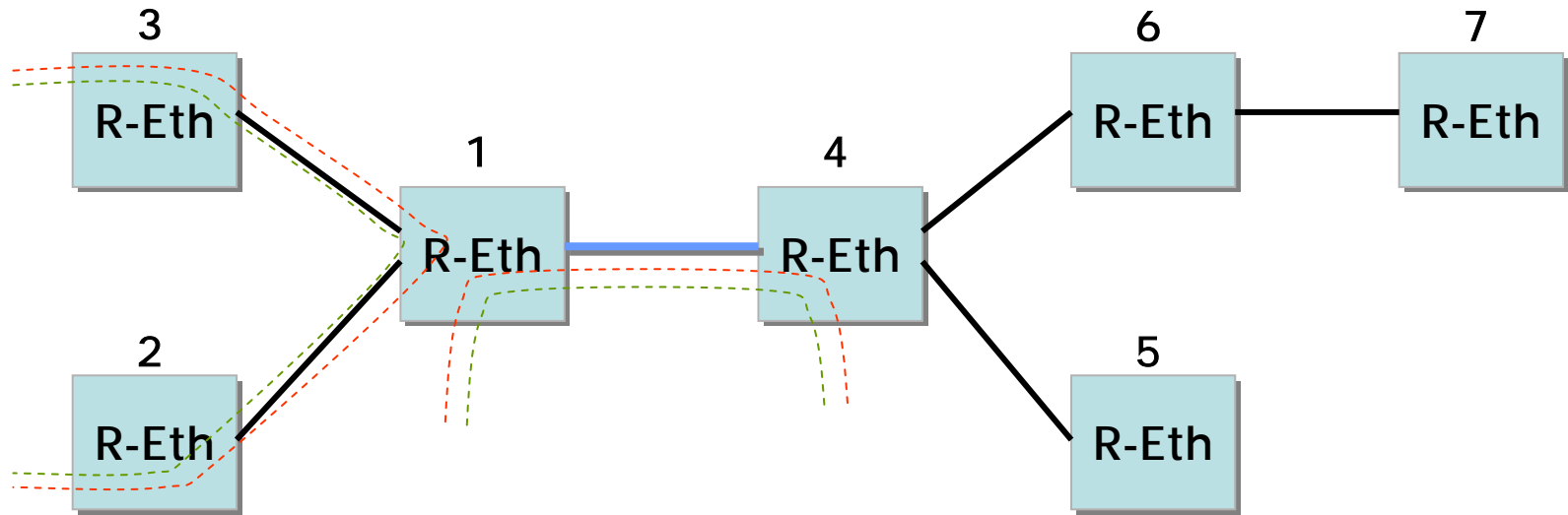
- Residential Ethernet will provide the kind of isochronous and deterministic low-latency services for real-time streaming of audio and video
- Not just for high quality audio and video, Residential Ethernet will be an ultimate solution for supporting different level of upcoming applications in human life such as e-Health, ubiquitous sensor network, networked IT-robot, and so on.
- Owing to its friendliness adopted widely, Residential Ethernet is superior to unify the heterogeneous wired and wireless networks by providing integrated isochronous and asynchronous frame switching
- Residential Ethernet will attract public attention not by just providing isochronous service, but by playing major role as a backbone

Residential Ethernet as a Backbone (II)



- Only managing to keep synchronization from an end to the other end is not enough
- As a backbone for heterogeneous wired and wireless network, Residential Ethernet should support more complex topologies and various mixture of traffic in sense of end-to-end

A Case as a Backbone



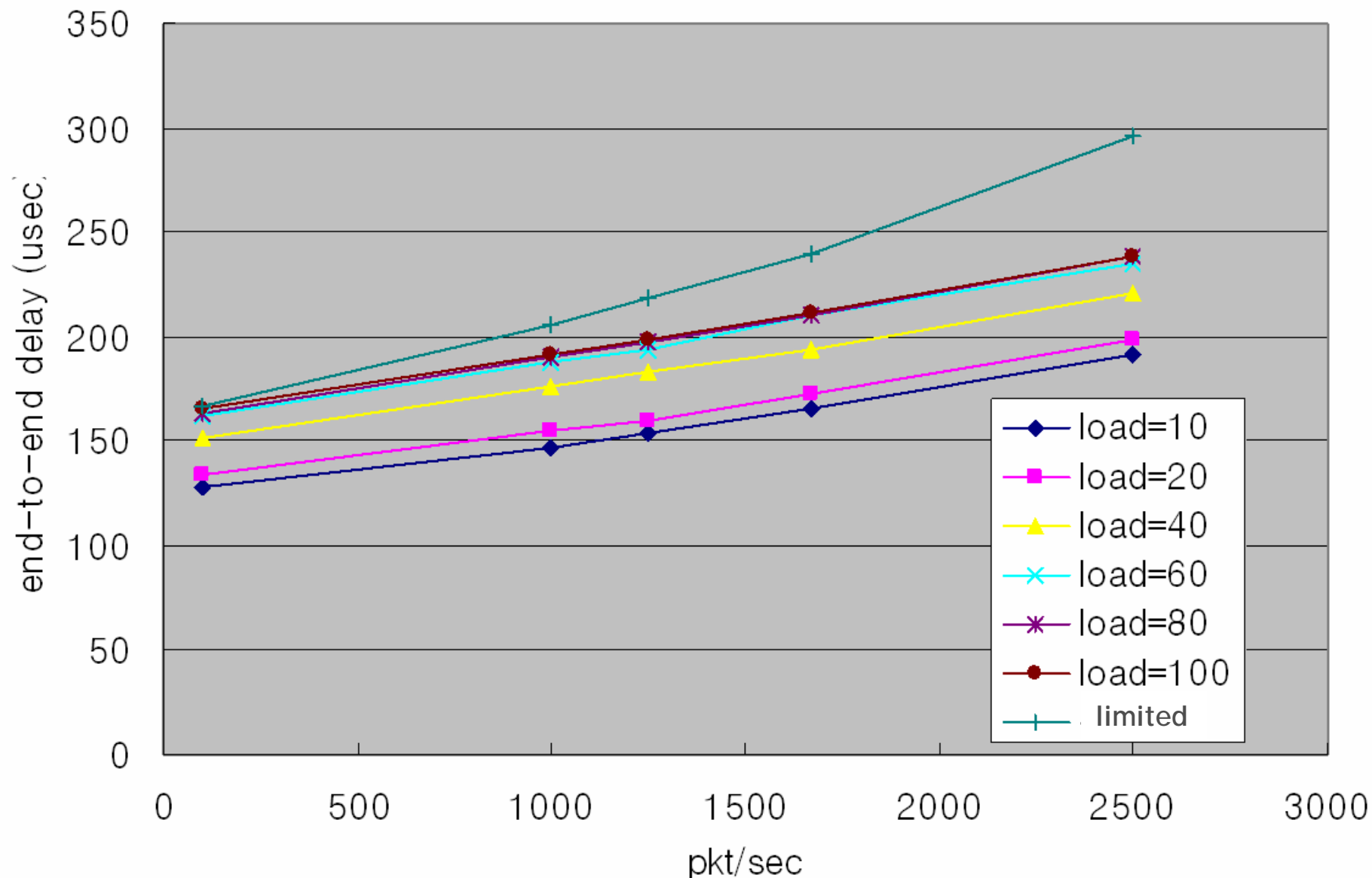
Synchronous traffic

- each nodes generate synch paths and destined to other nodes with uniform distr.
- synch path holds for 10, 20, ..., 100 time units varying to loads

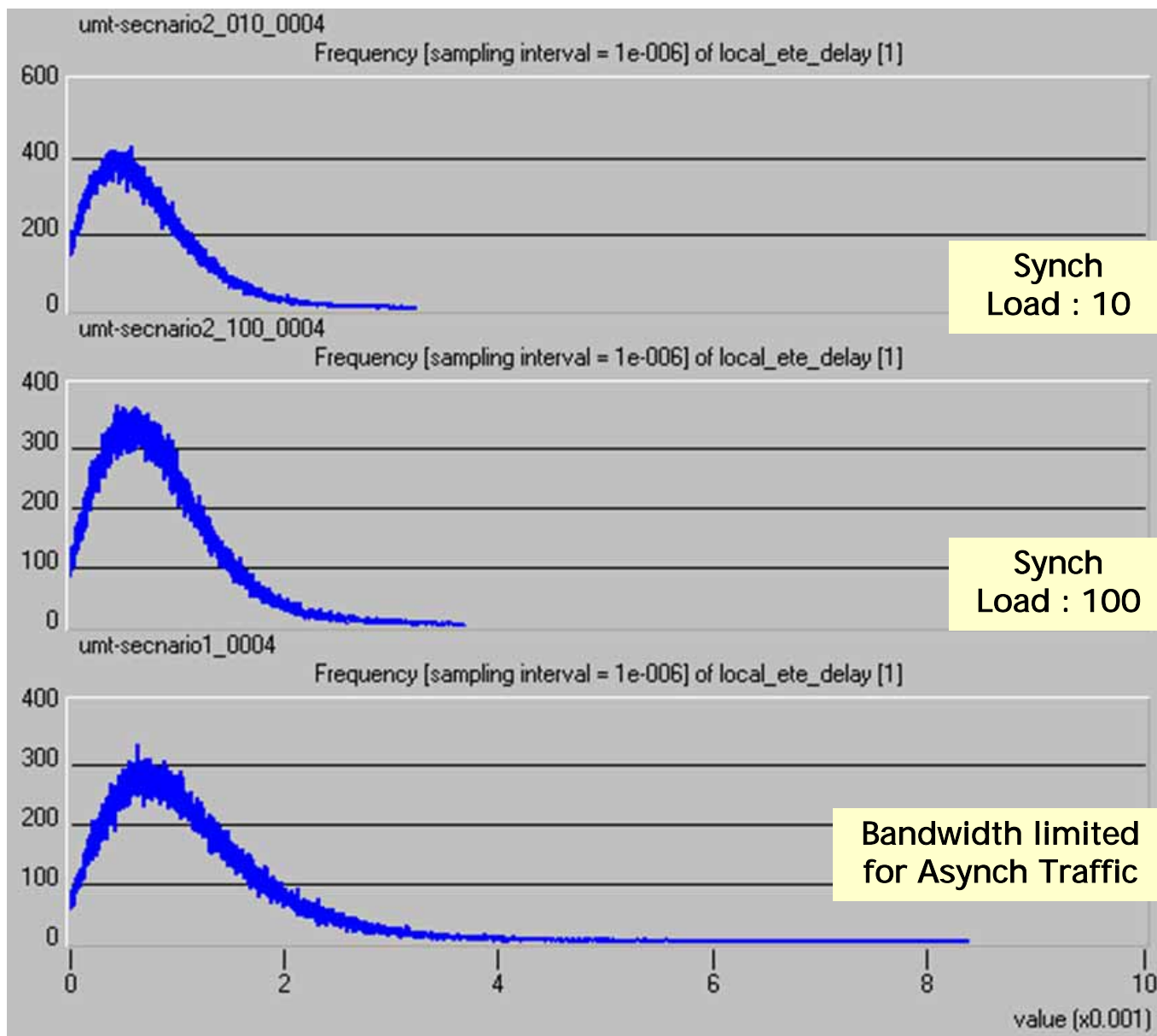
Asynchronous traffic

- average frame size is 8,192bit and destined to other nodes with uniform distr.
- asynch frame load : 100, 1000, 1250, .. 2500 frame/sec

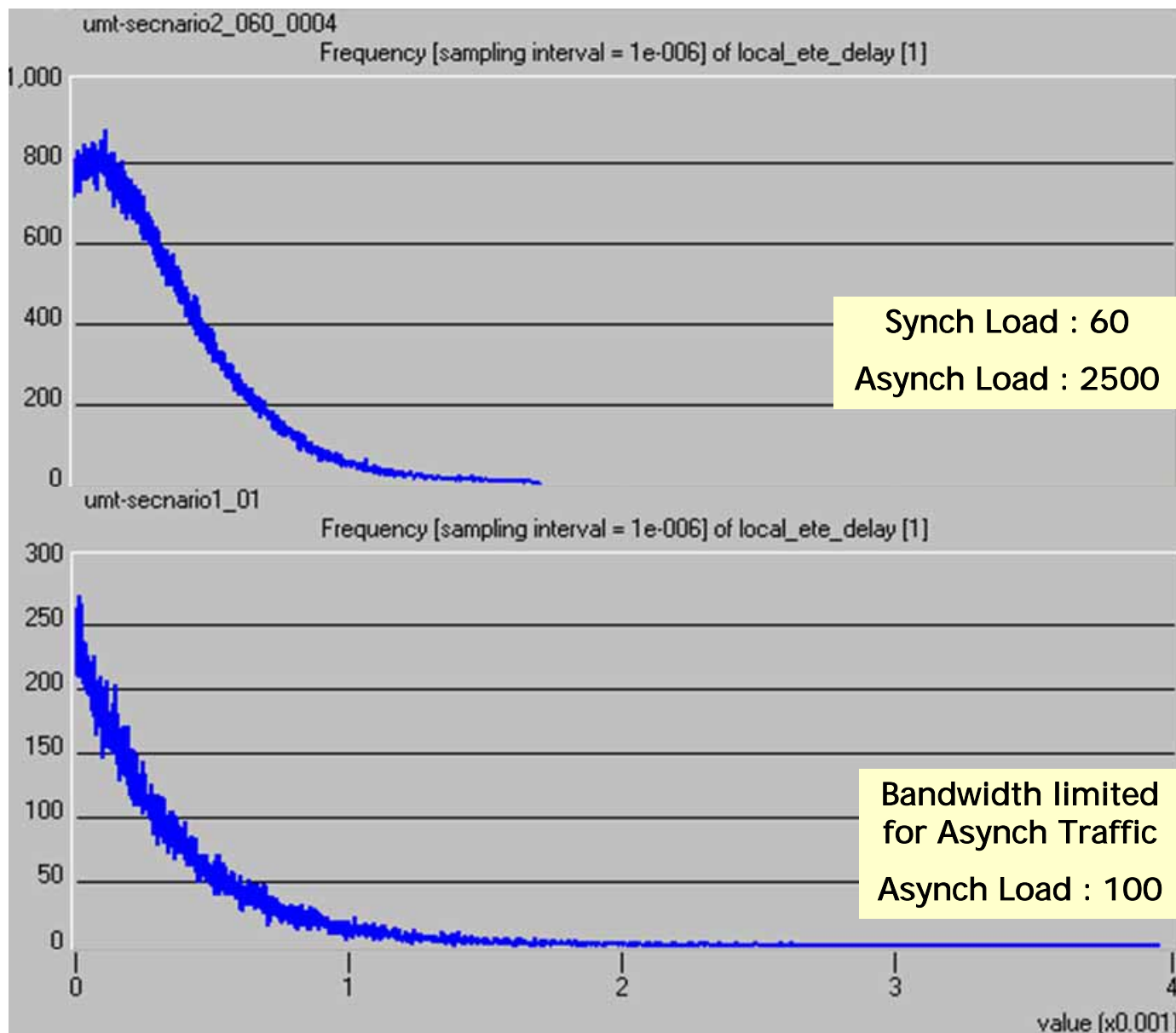
Delay of Asynchronous Traffic : 1 hop



Distribution of E2E Delay : 1 hop



Distribution of E2E Delay at same avg delay



Challengeable Task with Care

- Compare to conventional Ethernet handling prioritized asynchronous frames, needs to be more careful for relaying frames over multi-hops in Residential Ethernet
- It looks like
 - not just a problem of point-to-point bandwidth allocation
 - fairness problem, network wide optimality, congestion/blocking problem, ...
 - problems already encountered in end-to-end network
- Try not to reinvent, but make things go right
- It might be not much different from Ethernet in view of MAC, but Residential Ethernet as a backbone should have something because of unavoidable concept on end-to-end and integration of synchronous and asynchronous traffic

Summary

- Residential Ethernet will attract public attention not by just providing isochronous service, but by playing major role as a backbone
- Compare to conventional Ethernet, needs to be more careful for relaying frames over multi-hops in Residential Ethernet
- Although network wide control is out of scope, need to check possible proposals can provide tools to guarantee end-to-end bandwidth and optimality in view of network