

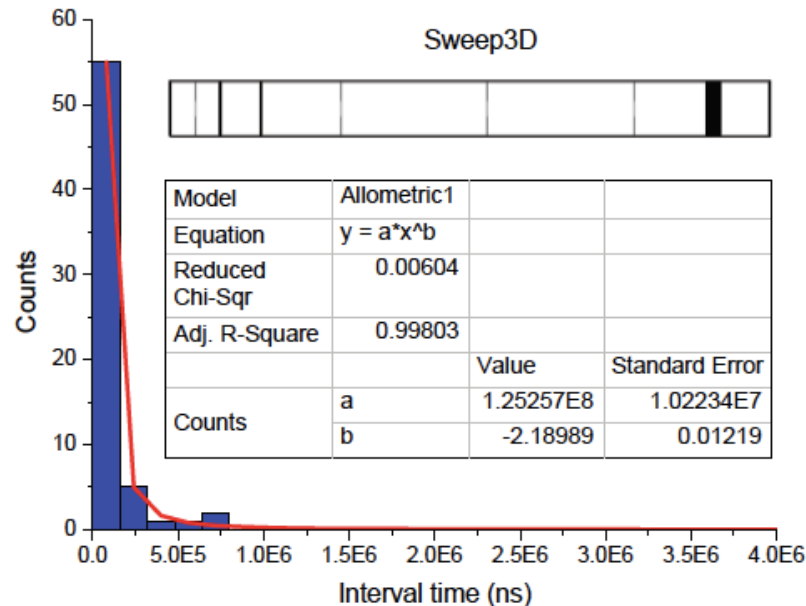
Analyzing time-dimension
communication characterizations for
representative scientific applications
on supercomputer systems

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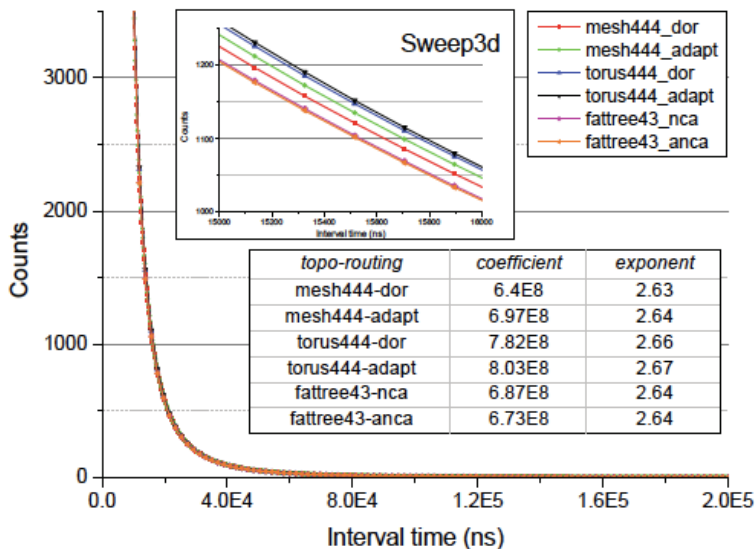
Problems & Ideas

- Problems of communication characteristics analysis for large-scale parallel applications
 - The types of applications have a great influence.
 - How to figure out the communication behaviors?
- Ideas: statistical regularity in time-dimension communication characteristics for representative scientific applications
 - The distribution of communication event intervals has a power-law decay?



Main Contributions

- We prove the distribution of communication event intervals has a power-law decay.
- Results on all kinds of platforms indicate that the communication events show a “strong-bursty and weak-memory” characteristic and their intervals reflect the periodicity and the dispersion.
- **The power-law fitted curves of the histograms of the communication event intervals with different network topologies and routing policies.**
- **The distribution exponents in Web pages of homogeneous category and communication event interval.**



exponents in Web page distribution	Computer science	Universities	Companies	Newspaper
	2.66	2.63	2.05	2.05
exponents in communication event interval distribution	OpenFOAM	QMCpack	Sweep3D	GROMACS
	2.34	2.38	2.19	2.25