Fits fail of well known distributions to network traffic. 
We’re studying enterprise traffic distributions of flow counts in time intervals of 4 to 512 seconds. 
It’s hard to know if bursty traffic distributions are really heavy-tailed;

In general, hierarchical models, such as mixture models, are both parsimonious (use fewer parameters) and offer better explanations.

More precisely, fits to a mixture model reveal a substantial exponential component,…

Testing different numbers and combinations of exponential and power law components, an exponential-Power law mixture (with 3 df) consistently obtained the best BIC score. These plots show the resulting mixture density (black) superimposed on the data histogram (dots), and the mixture functions’ (colored) sequences’ convergence.

...whose parameters are stable across time-step size.

Removing the usual suspects might explain this.
Conditioning on traffic from persistent destination addresses shows strong differentiation in spiky-ness. Rare connections (those not persistent) are less spiky. Thus http connections to external websites tend to exhibit better behaved traffic, and, since spikes in routine enterprise services are known, they can be accounted for.
We’d like to show that mixture components we’ve uncovered can be explained by these observations.

This work is based on 300+ data sets of user network traffic that we collected over a five week period. These Forbidden City traces are available on projects in collaboration with our research.