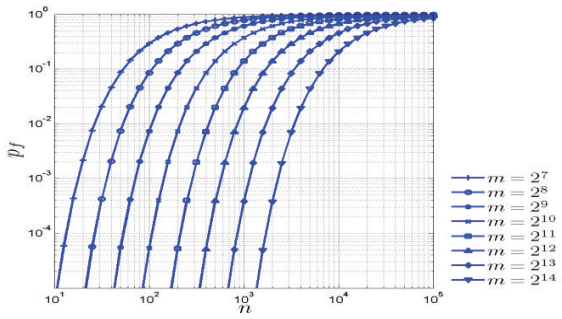

Figure 4. False positive probability of Bloom filter aggregation.

Figure 4 shows the false positive probability p_f as a function of the number of aggregated elements n in the filter and the filter size m, assuming an optimal value of k is used. The probability of false positives decreases as m increases, and increases as n increases. Note that sOIDs are only used in the content location publishing process, and are not carried in data packets. Thus there is great flexibility in designing the filter length to meet the requirements of false positive probability and the maximum number of elements to be aggregated in a filter. For example, 1000 suffix elements can be inserted in a 1024-byte long Bloom filter to generate a digest of the suffixes in an sOID (reducing the number of OID routing states by 1000 times), but the false positive probability is no more than 3 x 10^{-4}.

6. CONCLUSIONS AND FUTURE WORK

This paper proposes SMVDHT, a new name resolution and routing framework, which uses a combination of name aggregation and multi-level virtual DHTs to improve ICN scalability. A content router can publish both the prefix and the digest of suffixes to reduce the size and update overhead of name resolution tables, while relieving the "suffix-hole" problem encountered in traditional prefix-based aggregation. New protocols are designed to efficiently resolve the aggregated names and forward a request to the closest copy of content via multi-level virtual DHTs. For future work, we plan to prototype the proposed system and conduct extensive experiments to evaluate its performance and compare it with other name-based routing and resolution schemes.

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