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1 Datasets

Datasets are split in REAL or SYNTHETIC and are based on the the source of the routing table:

- REAL-Tier-1-A: real core backbone router in a global tier-1 ISP
- REAL-Tier-1-B: national backbone router in research and educational network of WIDE Project.
- SYN1: each procedure that is no longer than /24 and /16 is split into two and four prefixes
- SYN2: Each prefix that is no longer than /24, /20 and /16 is split into two, four and eight prefixes

Notation:

- binary radix depth: longest prefix matching

2 Traffic Patterns

Take the following traffic patterns into consideration:

- random: 2^{32} random traffic patterns (generated by xorshift).
  - overhead for generating the data is included in the measurements, but it is small.
- sequential:
  - Generates in the range 0.0.0.0 to 255.255.255.255
- repeated
  - Similar to random but each random lookup is repeated 16 times
- real-trace
  - real traffic trace

3 Using the different libraries

- modified_poptrie
  - need to copy the test data files to modified_poptrie/build/tests
  - last test doesn't pass
- modified_radix_tree
- modified_tree_bitmap
  - rm_test_v6 need to pass the input file here to measure runtimes.
  - use the runtime information and memory usage to compute the lookup rate
- modified_sail
  - uncomment runtime measurement commands in function sailPerformanceTest()
  - QueryPerformanceFrequency() function doesn't exist
  - QueryPerformanceCounter() doesn't exist

3.1 Datasets included in libraries

- modified_poptrie/tests
  - linx-rib.20141217.0000-p46.txt
  - linx-rib.20141217.0000-p52.txt
  - linx-rib-ipv6.20141225.0000.p69.txt
  - linx-update.20141217.0000-p52.txt

3.2 Comments on preallocation of memory for data-structures

- It makes sense to preallocate, because the data structures will be initialized once and then remain as is.
- lookup rate = number of lookups / total runtime

Configuration	s	# inodes	# leaves	Mem (MiB)	Init (s)	Rate (Mlps)	CPU cycles
Radix	-						
Poptrie	2	$36,412$	$63,527$	7.575	2.16	71.91	45
	16	$14,664$	$56,367$		1.79	$285,7$	
	18	$14,664$	$56,367$	6.12	1.80	316.8	

Table 1: The compilation time, the number of nodes, the memory footprint, and the lookup rate for random with direct pointing (s = 0, 16, 18)

Configuration	s	total memory	routes	trie memory	loads	stores
Poptrie	2	94.6	55.5	39.1	7.450	0.124
	16		routes	trie memory	loads	stores
	18		routes	trie memory	loads	stores

Table 2: The total allocated memory, memory used for the routing table, memory footprint, load accesses, store accesses for poptrie with leaf compression, direct pointing and s = 0, 16, 18 (MiB)

3.3 Tables

characteristics:

- poptrie-basic-s
- poptrie-leafvec-s
- poptrie-s (direct pointing)
- #inodes
- #leaves
- memory footprint
- compilation time (we measure this because we reconstruct the tree. Does this include rebuilding the tree?)

3.4 Poptrie specification

- FIB: forwarding information base
- RIB: routing information base

figures/massif_poptrie_s2.png

Configuration	s	# inodes	# leaves	Mem (MiB)	Compilation (ms)	Rate (Mlps)
Radix	-					
Poptrie-basic	0					
	16			1.170.098.272	26.7 (2.72)	
	18			1.585.723.488	28.2 (3.61)	
Poptrie-leafvec	0					
	16					
	18					
Poptrie	0					
	16					
	18					

Table 3: The compilation time, the number of nodes, the memory footprint, and the lookup rate for random with direct pointing (s = 0, 16, 18)

3.5 Tables

characteristics:

- poptrie-basic-s
- poptrie-leafvec-s
- poptrie-s (direct pointing)
- #inodes
- #leaves
- memory footprint
- compilation time (we measure this because we reconstruct the tree. Does this include rebuilding the tree?)