

A Two-level Packet Classification Algorithm

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GET-INT

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Previous work

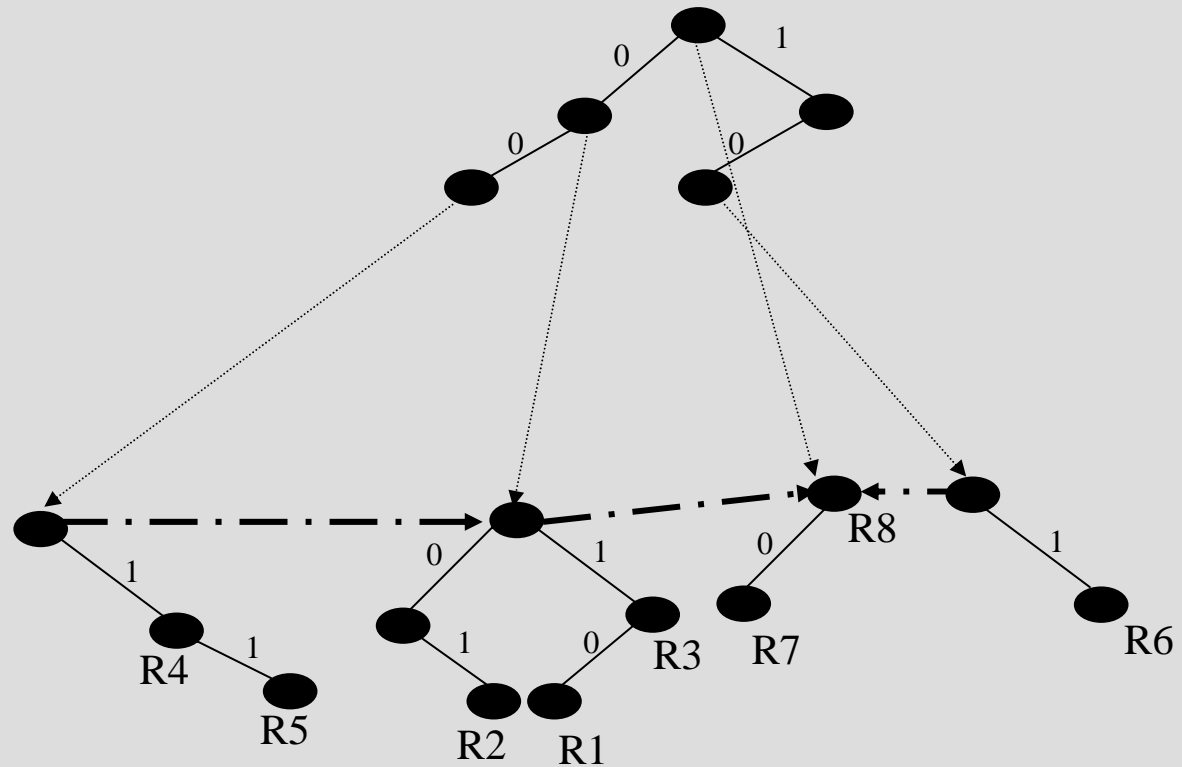
- Exhaustive search
 - Linear search
- Decomposition search
 - Crossproducting (Varghese&al, Sigcomm98)
- Decision tree
 - Grid-of-Tries (Srinivasan&al, Sigcomm98)
- Tuple space
 - (Srinivasan&al, Sigcomm 99)
- Geometric representation
 - Rectangle search
- Hardware
 - TCAM

The Extended Grid-of-Tries Algorithm

- EGT : Extended Grid-of-Tries
 - Decision Tree
 - F.Baboescu, S.Singh, G.Varghese *Packet Classification for Core Routers: Is there an alternative to CAMs?* Infocom 2003
 - Performance Complexities :
 - Search time: $O(W)$
 - Storage requirement: $O(NW)$
 - Updates time: $O(NW)$
- W : number of bits on one dimension
 N : number of filters

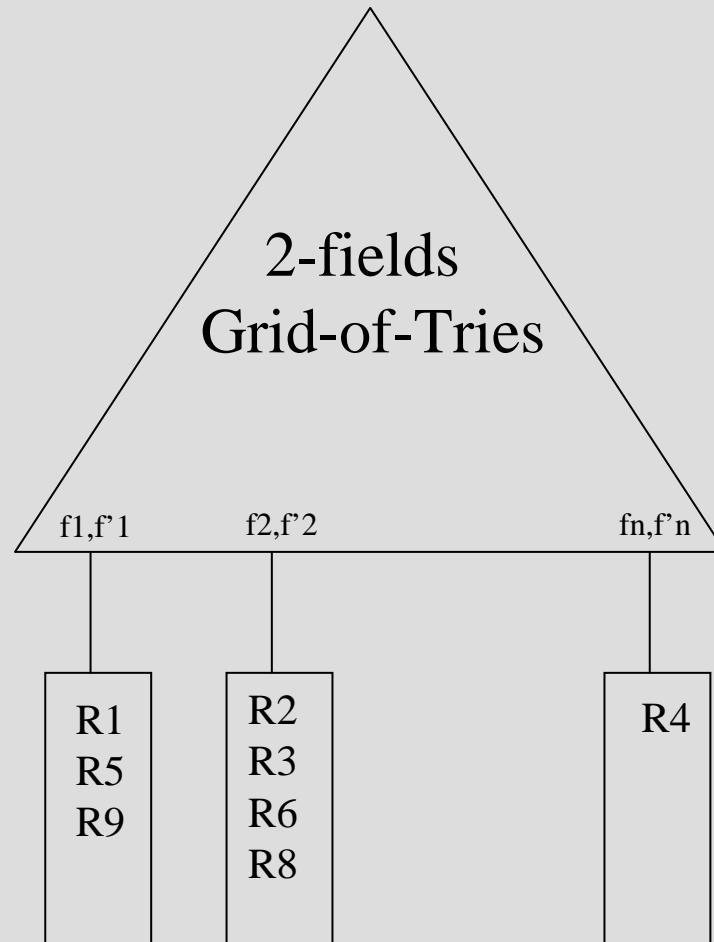
The Grid-of-Tries algorithm

Rule	Field1	Field2
R1	0*	10*
R2	0*	01*
R3	0*	1*
R4	00*	1*
R5	00*	11*
R6	10*	1*
R7	*	0*
R8	*	*



P (0011,1110)

The Extended Grid-of-Tries



The Two-Level Algorithm

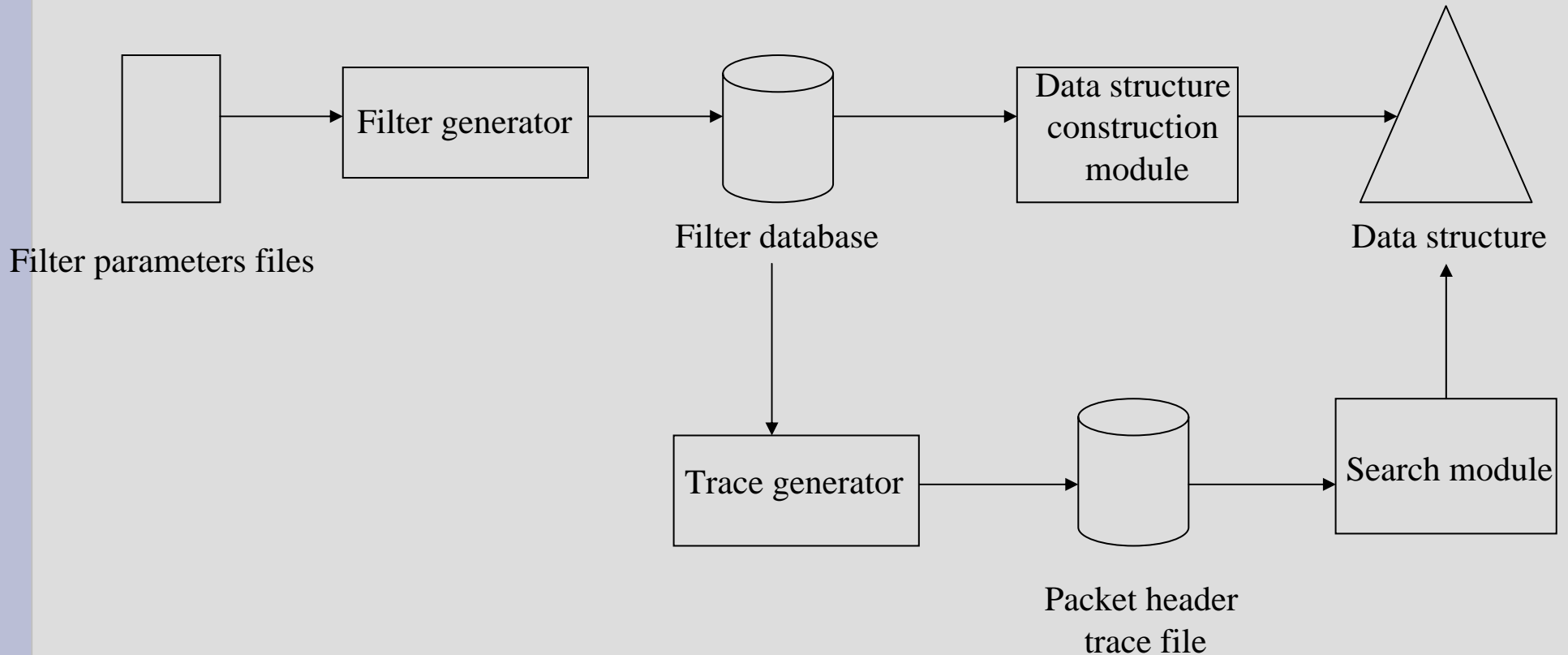
- Multi-fields packet classification (source and destination addresses, source and destination ports, protocol)
- Guide the search over the decision tree
- How : using the results of past searches
- Hash table contains pointers on previous results
- CRC hash function.

Originality

- Packet header sequence of bits caching
- Vs**
- Existing approaches
 - 1 field result caching (routing cache)
 - 5 fields result caching (connections cache)

The packet classification benchmark

- Taylor, Turner, “ClassBench: A packet Classification Benchmark”, Infocom 2005



Performance results

- Caching over 2 fields
- Entries in hash table : 10% of entries in trace file.
- 3 test scenarios (5000 filters, about 60000 packet headers)

=> **30%** improvement in search time

Conclusion

- Our algorithm improves practical best-matching search time for filter databases
- Same complexities as EGT
- Perspectives :
 - Test performances with real traffic
 - Behaviour using various bit pattern lengths