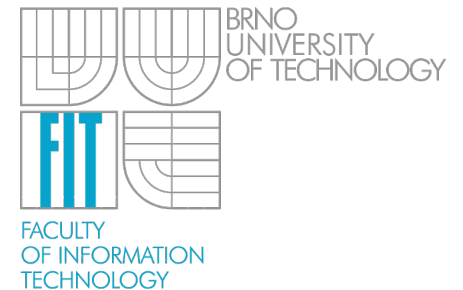


Runtime Support for Multicore Packet Processing Systems

Viktor Puš

Brno University of Technology, Faculty of Information Technology
Božetechova 2, 612 00 Brno, CZ
ipus@fit.vutbr.cz



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Cíle článku

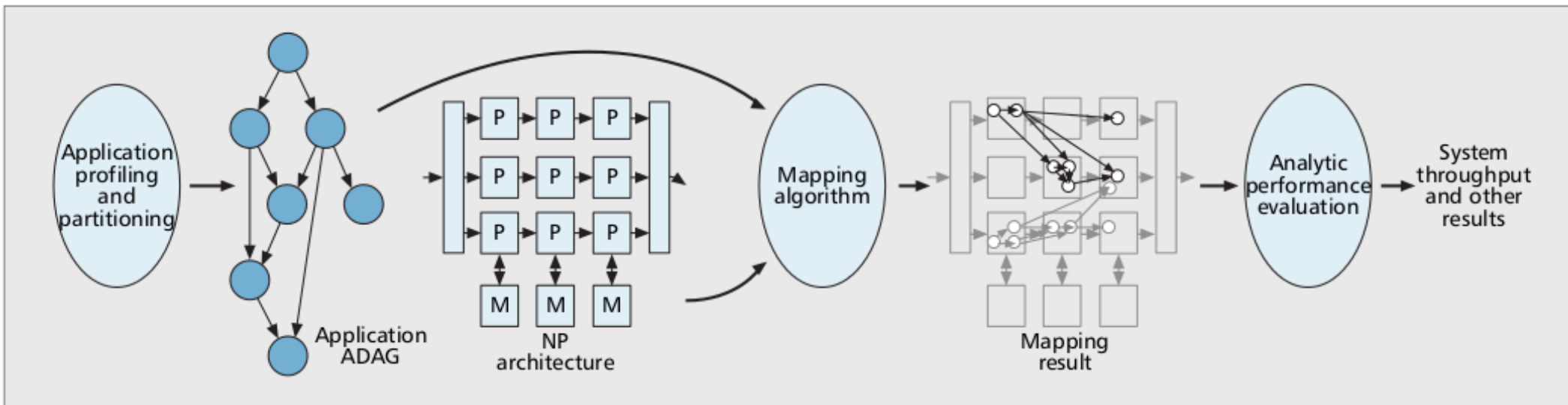
- Porovnání / vyhodnocení možností adaptability aplikací nad multicore network procesory
- Používají cycle-accurate analytický model network procesoru
 - to appear ACM Trans. Embedded Comp. Sys.

„Runtime Support“

- Application partitioning
 - Manual vs. Automatic
- Traffic characterization
 - Static vs. Dynamic
- Runtime mapping and adaptation
 - Static vs. Complete Dynamic vs. Partial Dynamic

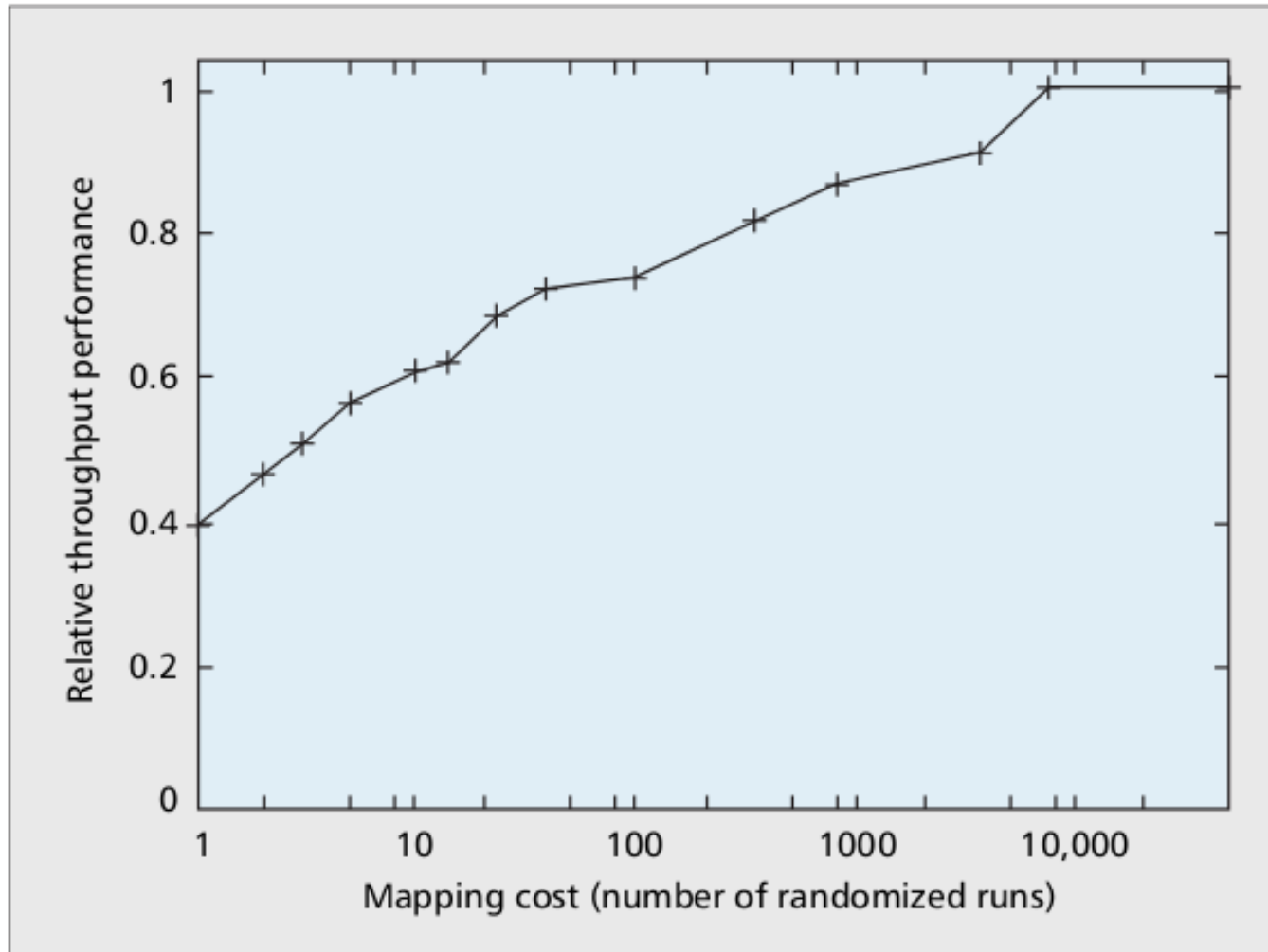
Měření

- Radix-tree-based IP-lookup
- Hash-based flow classification



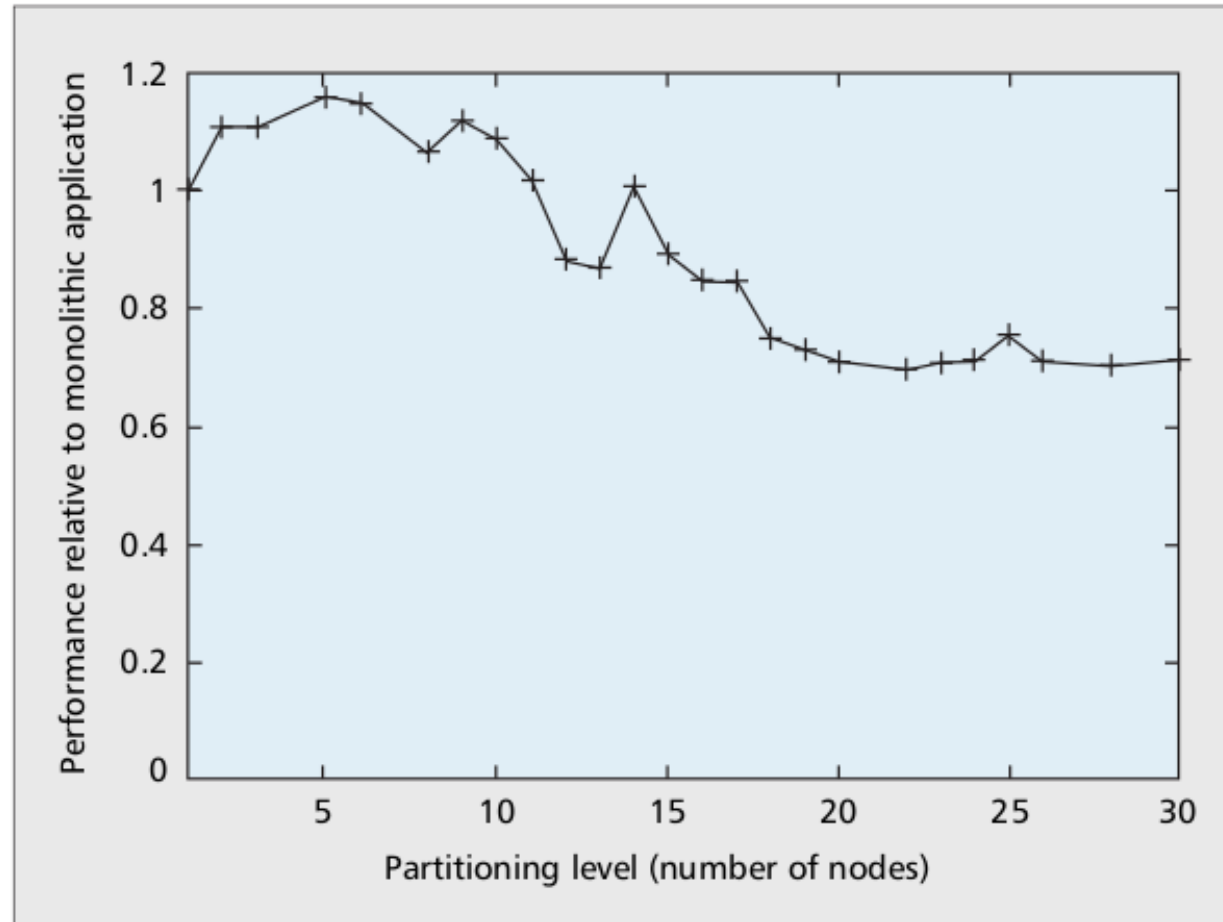
■ Figure 2. Application analysis, mapping, and performance evaluation process. Typically, multiple ADAGs are mapped to the NP architecture to reflect the workload mix that can be processed by the network processor.

Randomized mapping



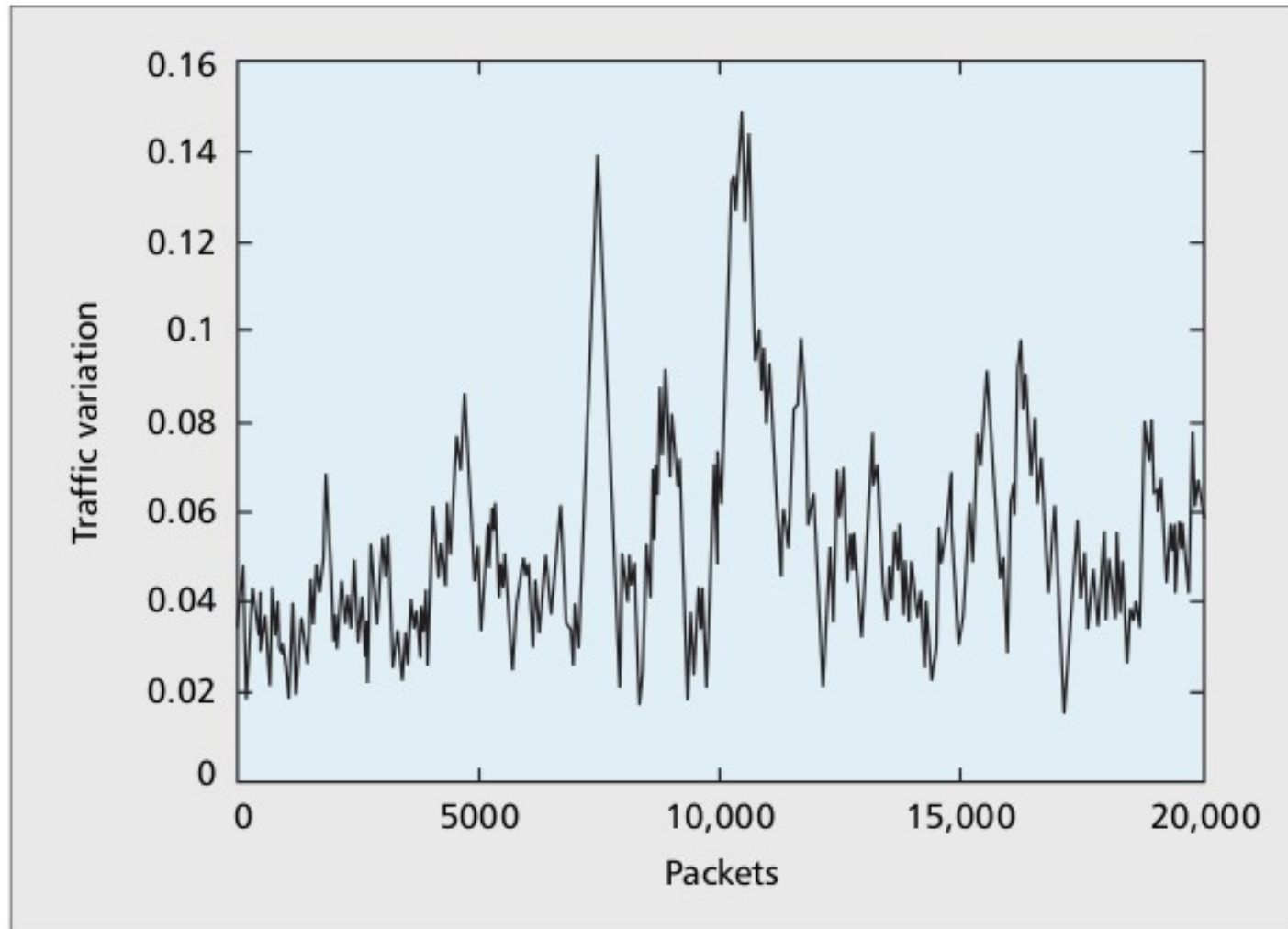
■ Figure 3. *System performance compared to mapping cost.*

Level of partitioning



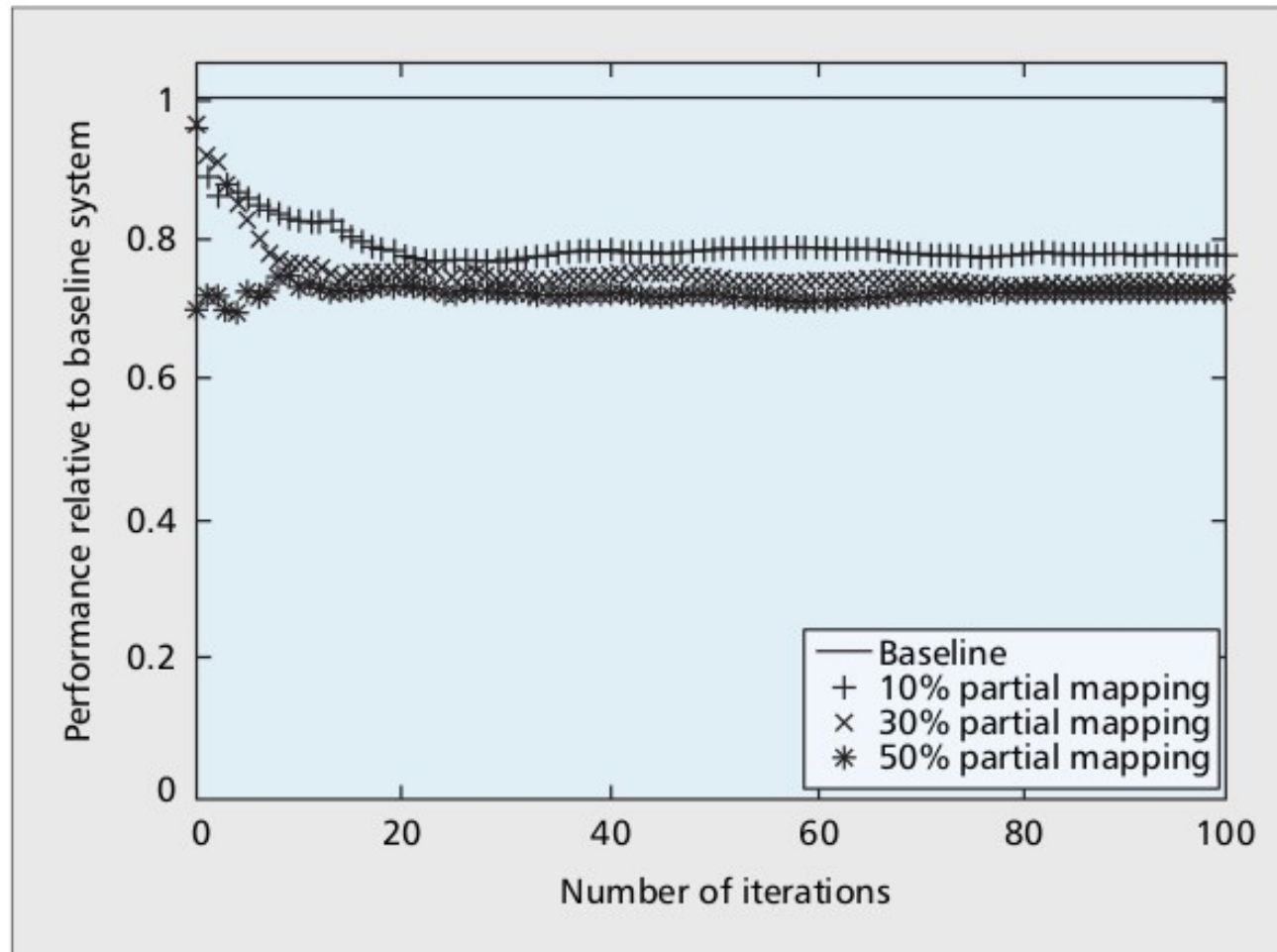
■ Figure 4. Performance for different levels of partitioning of a single application. The overall mapping effort is limited to 10,000 total node mapping attempts.

Traffic variation



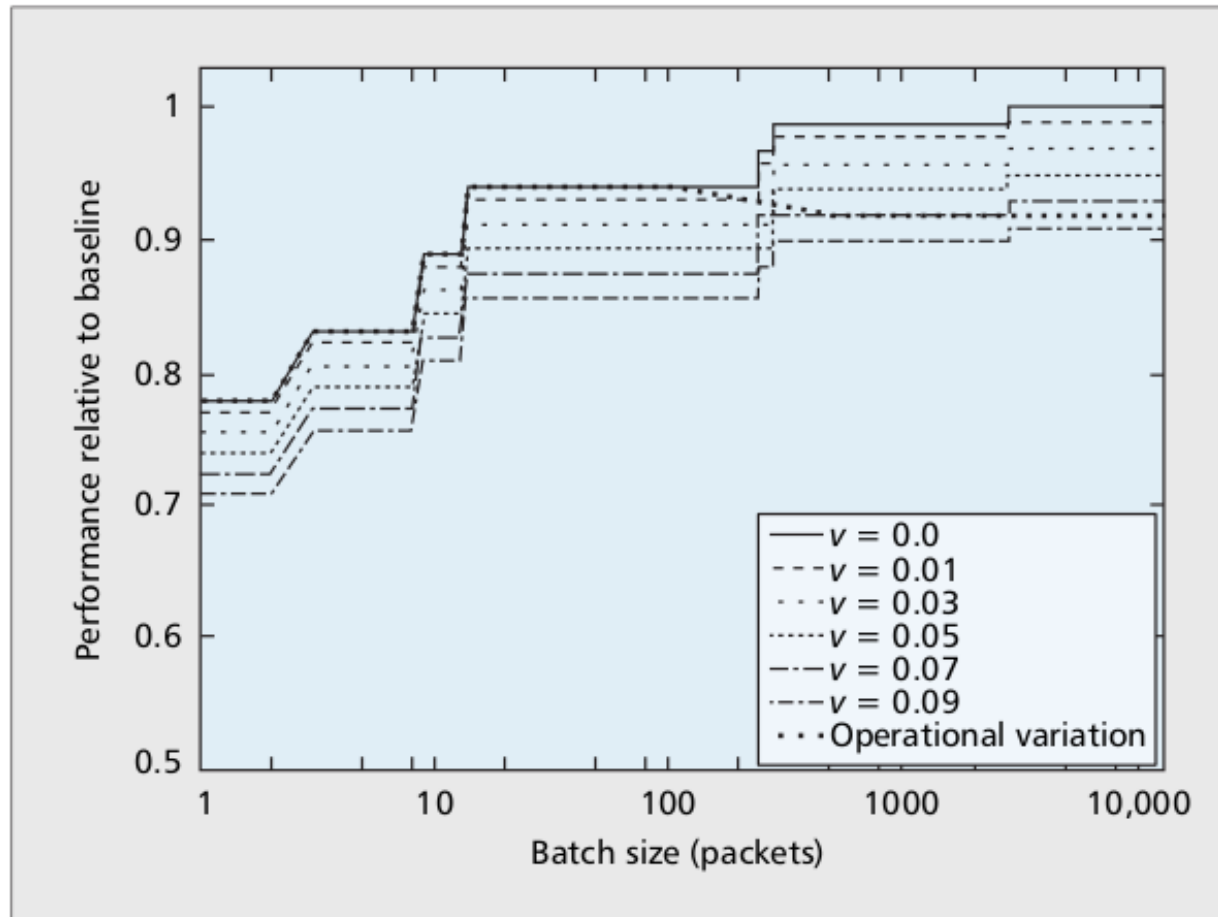
■ Figure 5. *Traffic variation over a sequence of packets.*

Partial mapping



■ Figure 6. *Performance degradation due to repeated partial mapping. The baseline case is a complete mapping.*

Batch size



■ Figure 7. Performance for different batch sizes under traffic variation. The total mapping effort is fixed, and the baseline case has infinite batch size with no traffic variation.

Configuration scenarios

	Static configuration	Predetermined configuration	Fully dynamic configuration
# of supported runtime configurations	1	4096	Arbitrary
Mapping computation	Offline (approx. 60 s)	Offline (approx. 60 h)	Online (5.3 ms/run)
Maximum adaptation rate	N/A	330 adapt./s (100% quality)	1 adaptation/s (60% quality)
Memory	20 kbytes	16 Mbytes	20 kbytes

■ Table 2. Configuration scenarios for different runtime systems on the Intel IXP2400.

Diskuze