

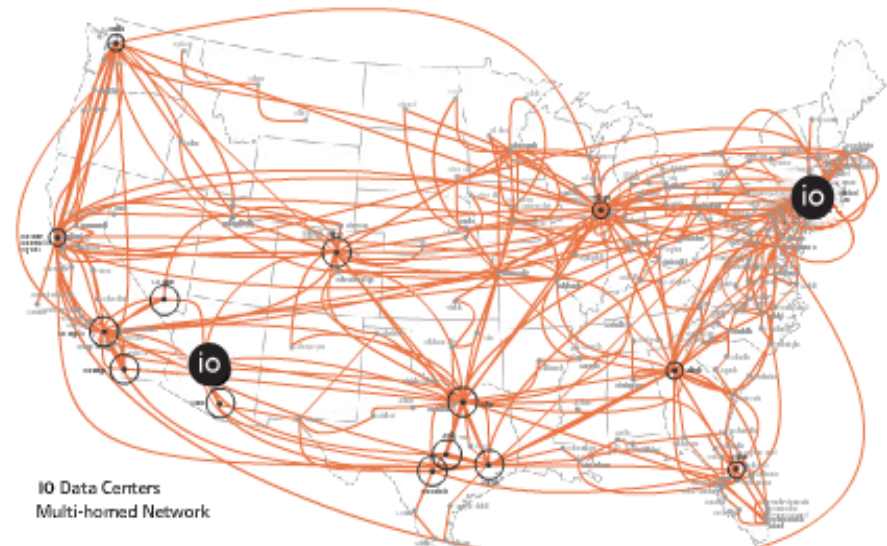
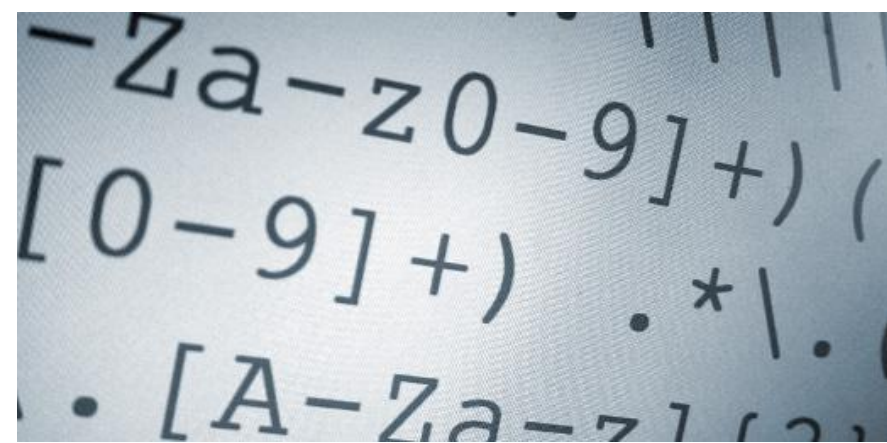
Multi-flow Regular Expression Matching

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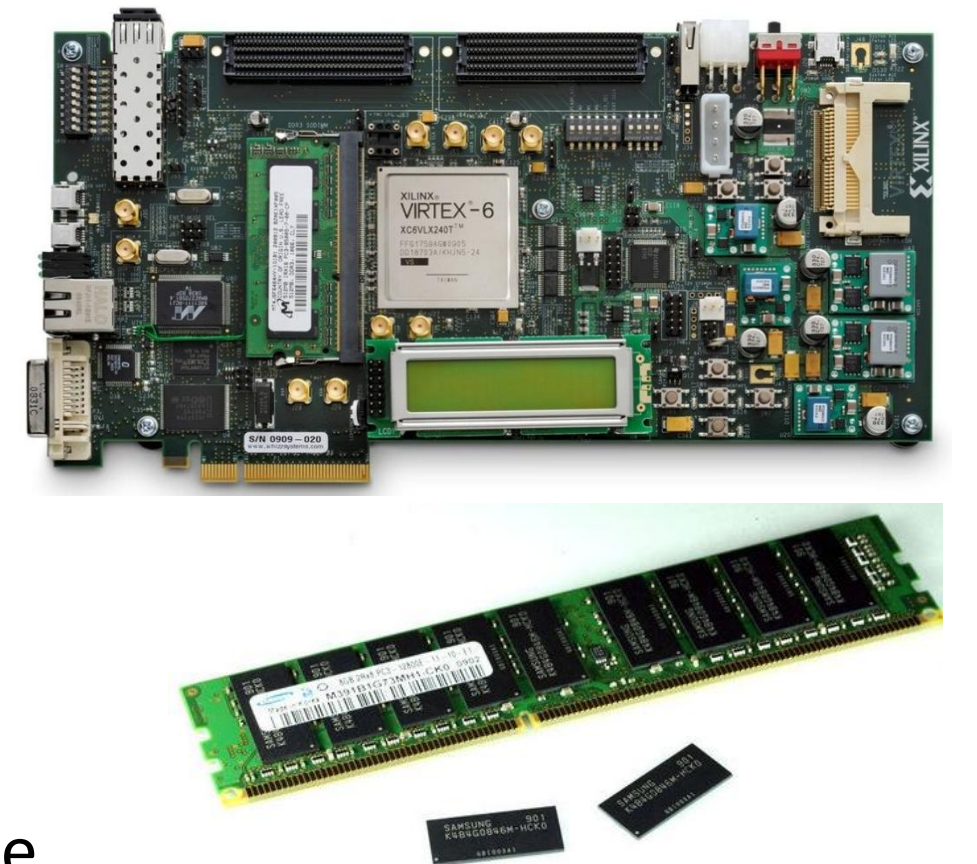
Background

- Regular Expression Matching (REM)
 - scan packet flows during **runtime**
 - essential function of network routers for **cyber-security**
- Network traffic
 - 40%~50% bandwidth growth per year
 - security issue**: worms, virus, etc.
 - consists of **millions of packet flows**

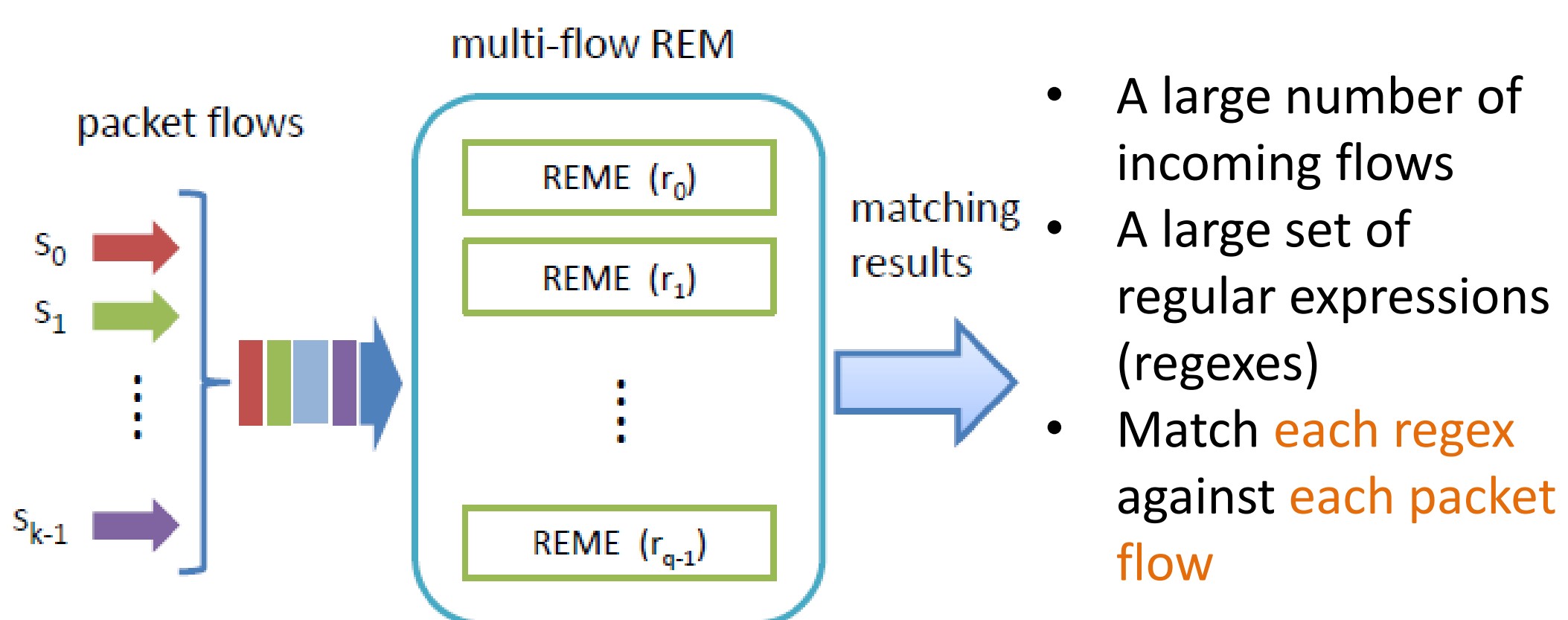


Challenges

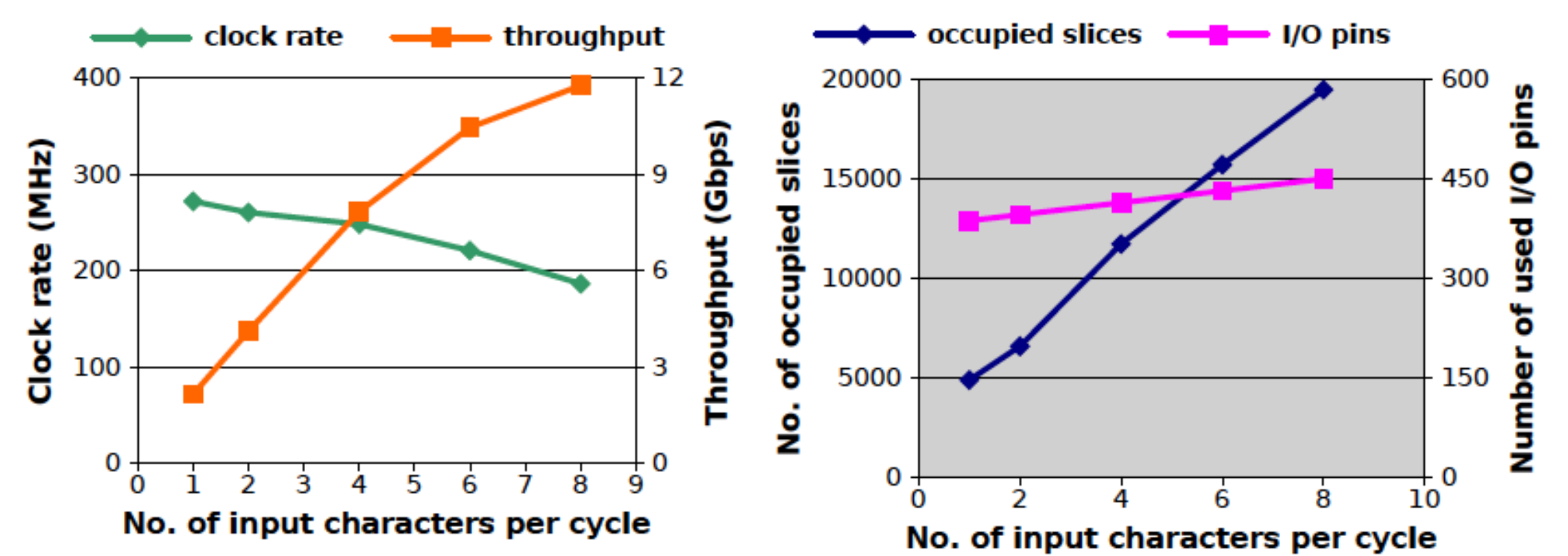
- Multi-flow REM
 - increasing internet bandwidth
 - require **high throughput**
 - scalable for concurrent flows
 - efficient **context switch**
 - high-speed multi-flow REM system
 - use **FPGA** for on-chip circuit
 - large number of states
 - use **off-chip memory** for storage



Motivation

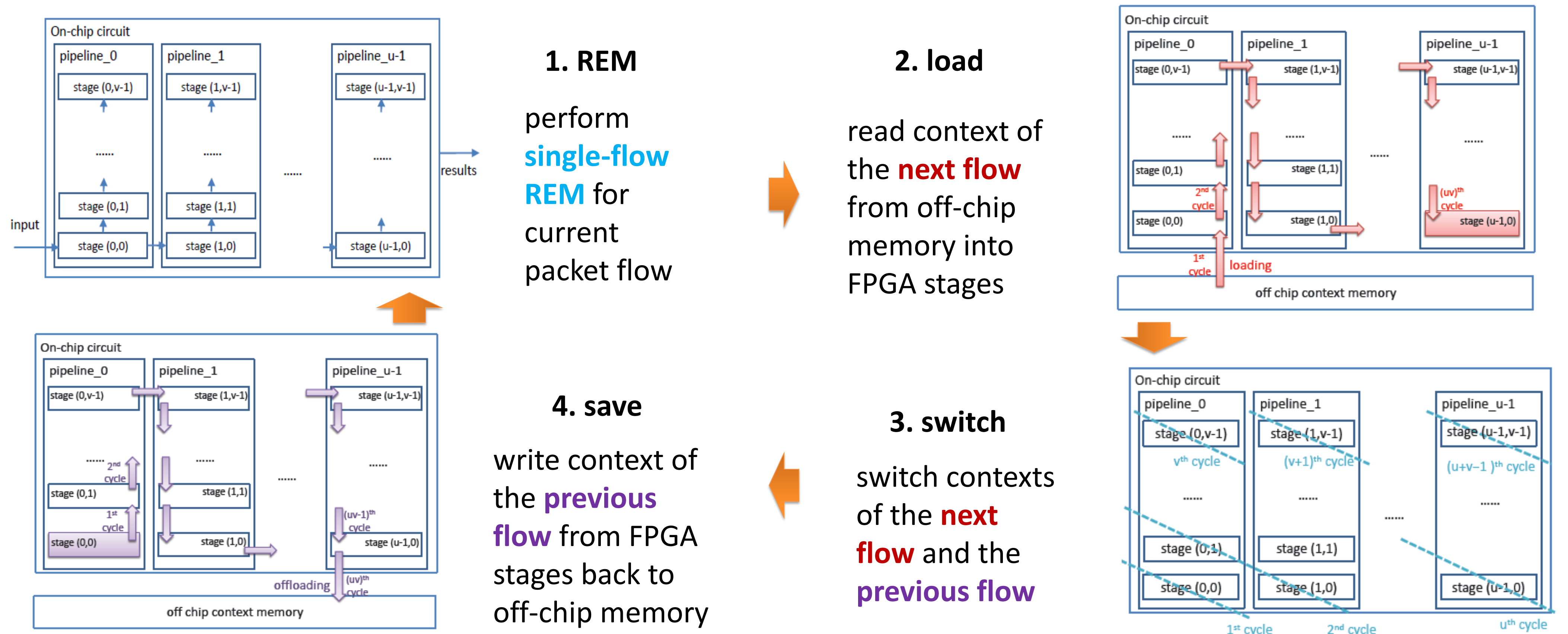


Experiments



- Handle **efficient multi-character matching**
- Result in **minimal context switch overhead**
- Maintain **high throughput** compared with single-flow REM

Context Switch



Conclusion

- Capable of **large-scale** design
 - a **large set** of **regular expressions**
 - a **large number** of **packet flows**
- Maintain **high throughput**
- Achieve **efficient context switch**

Future Work

- Apply the same solution to other network applications
 - where **large amounts** of **states** are involved
- Run-time reconfigurable REM design
 - configure REM **during run-time**
 - choose specific **regular expression sets**