Compiler Support for Hardware Accelerators

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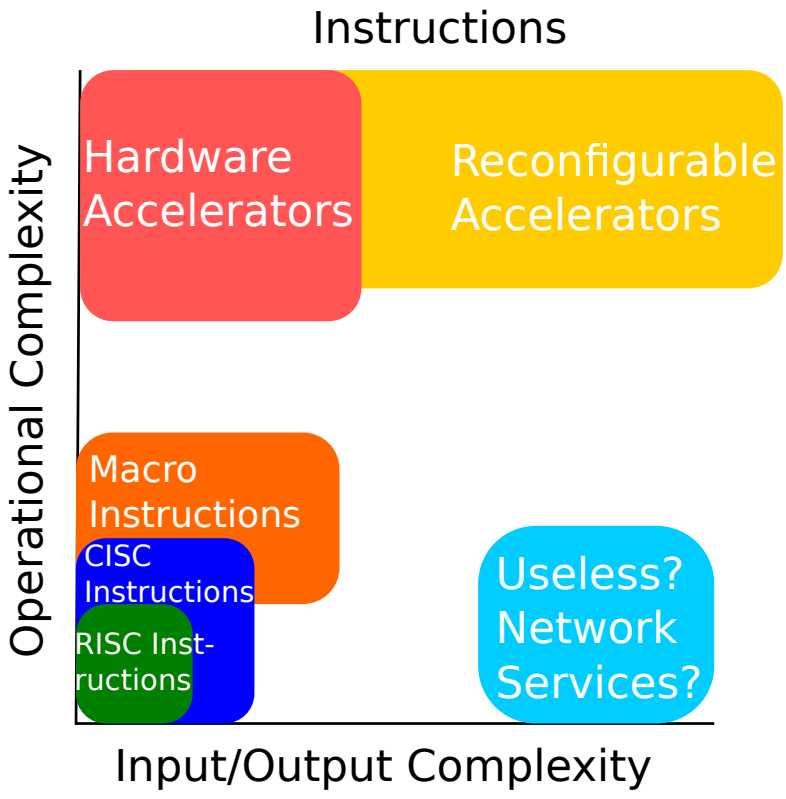
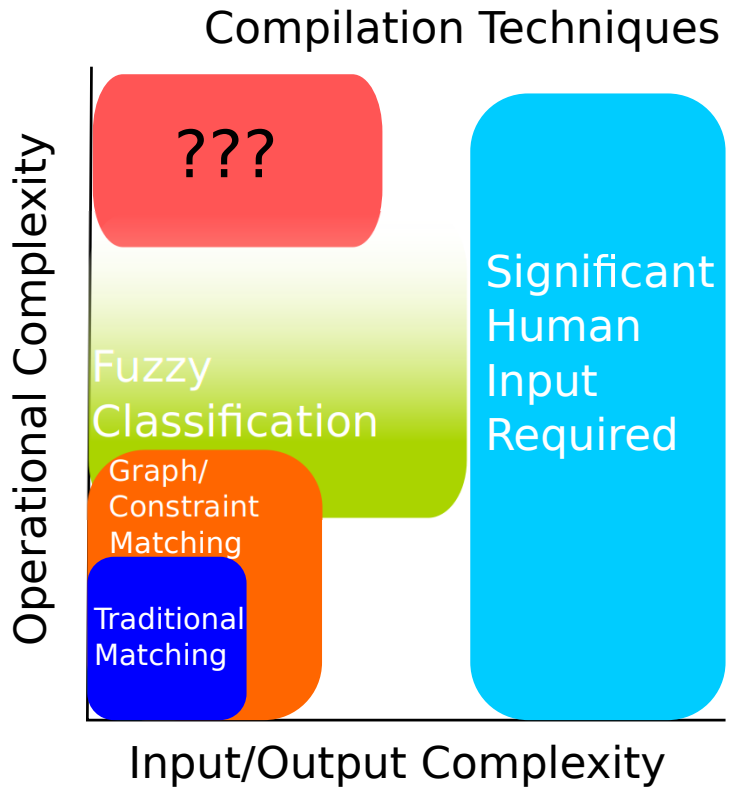
Big-Step Hardware Acceleration

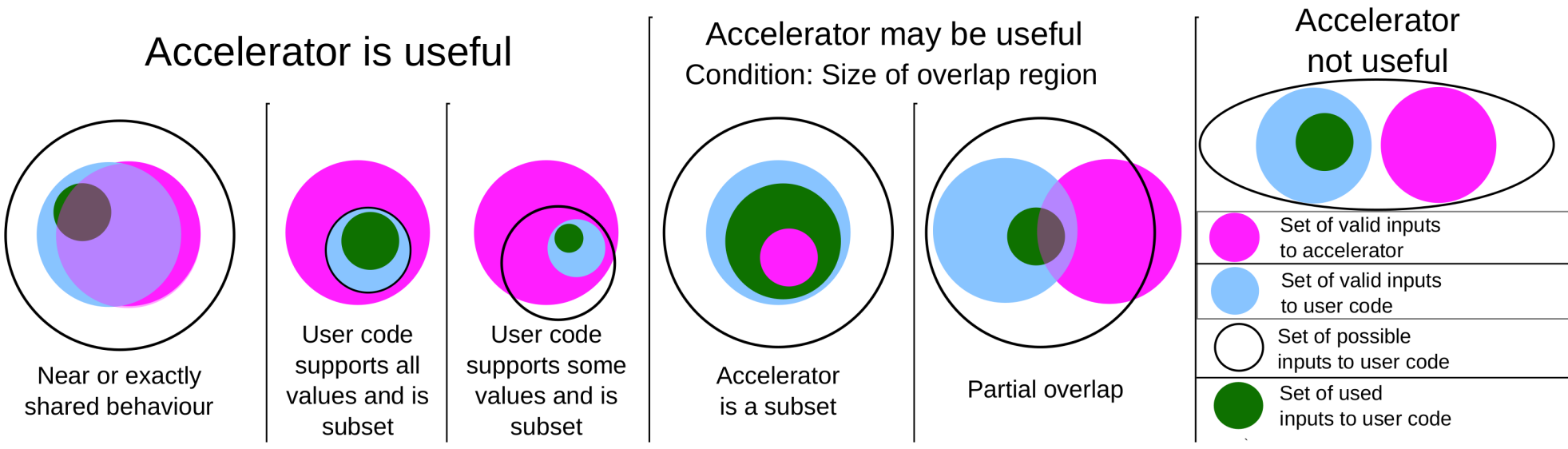
- Big-Step Accelerators do lots of things in one step:
  - FFT
  - CRC32
- The more an accelerator does, the more overhead can be amortized

Existing Compiler Technology

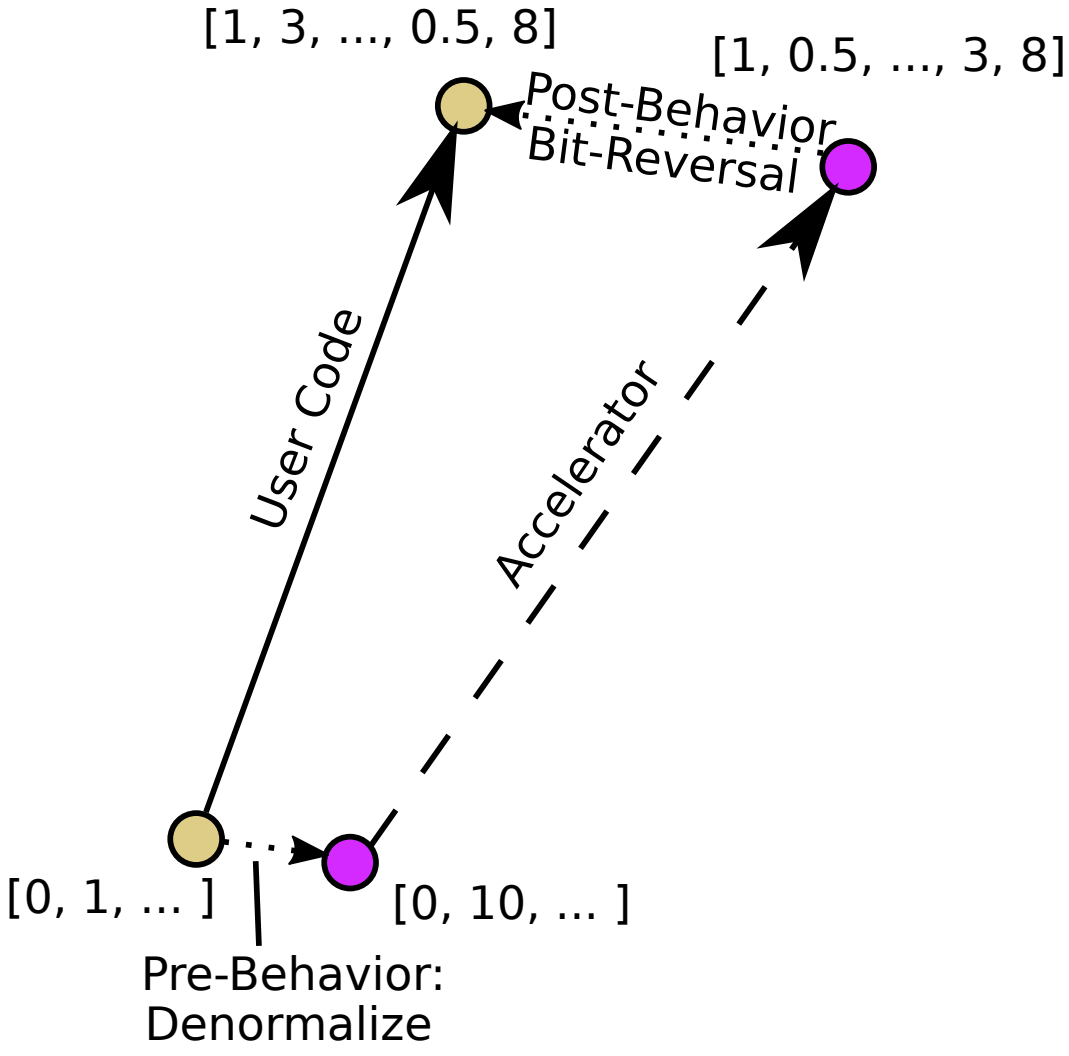




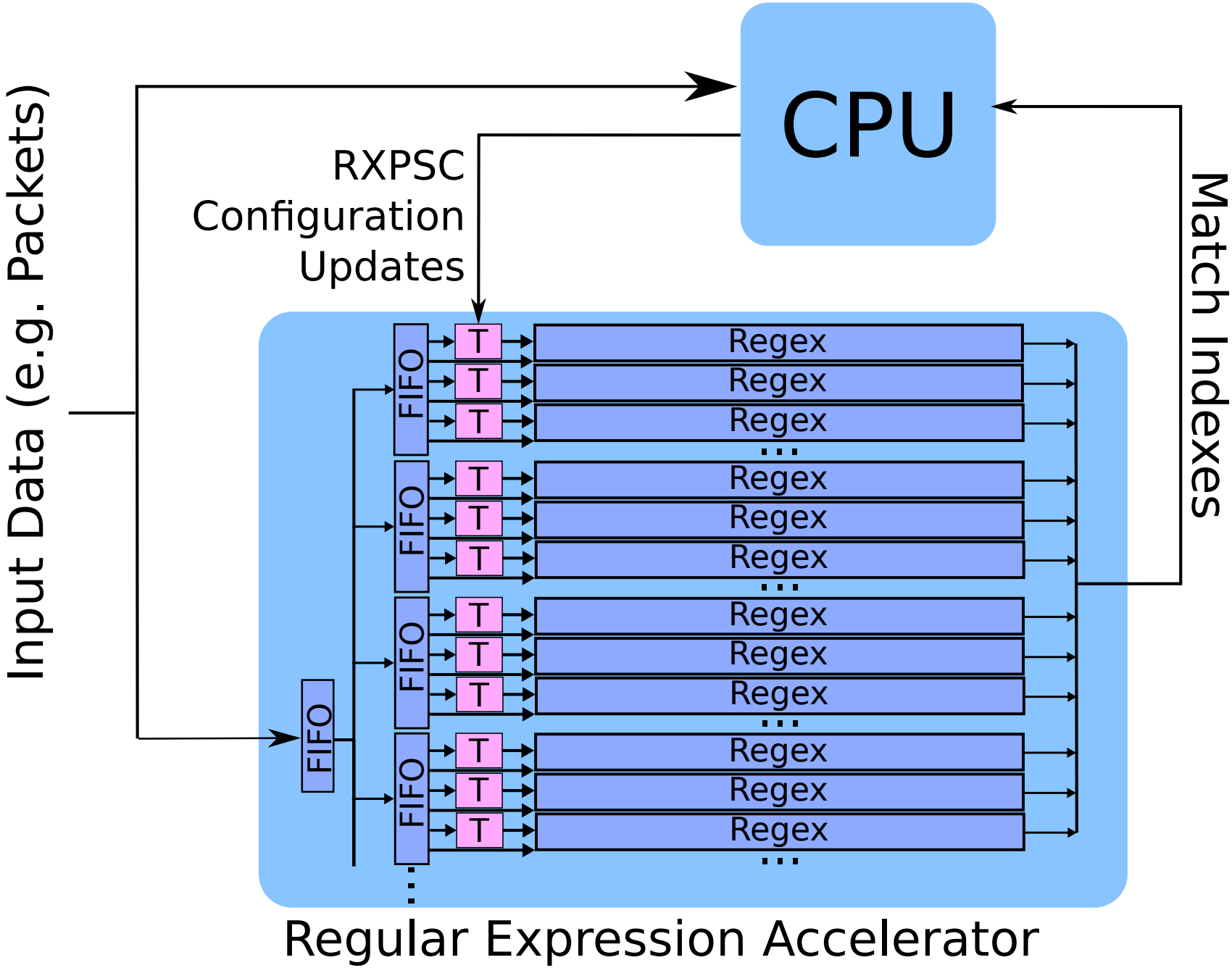
Matching Isn't Enough



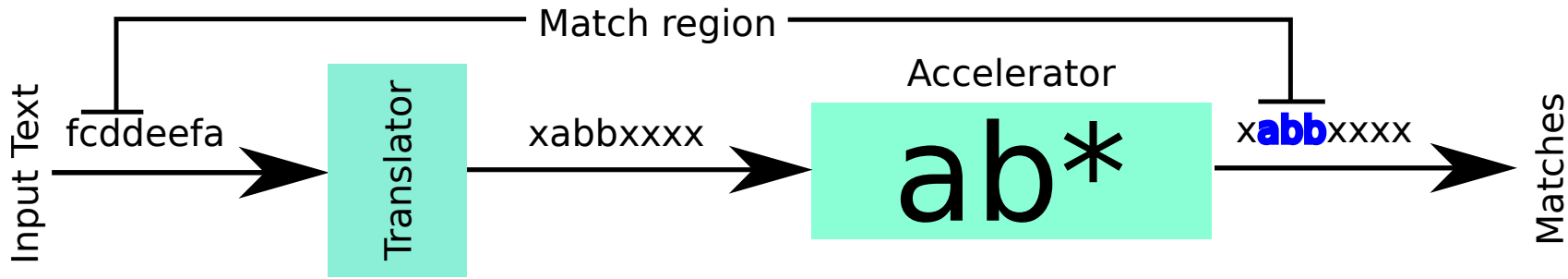
Supporting Hardware Accelerators



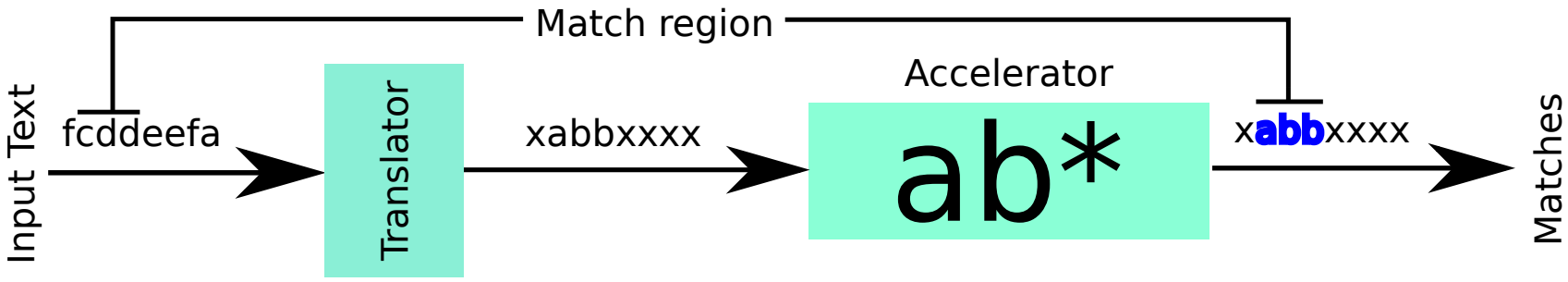
Regular Expression Acceleration

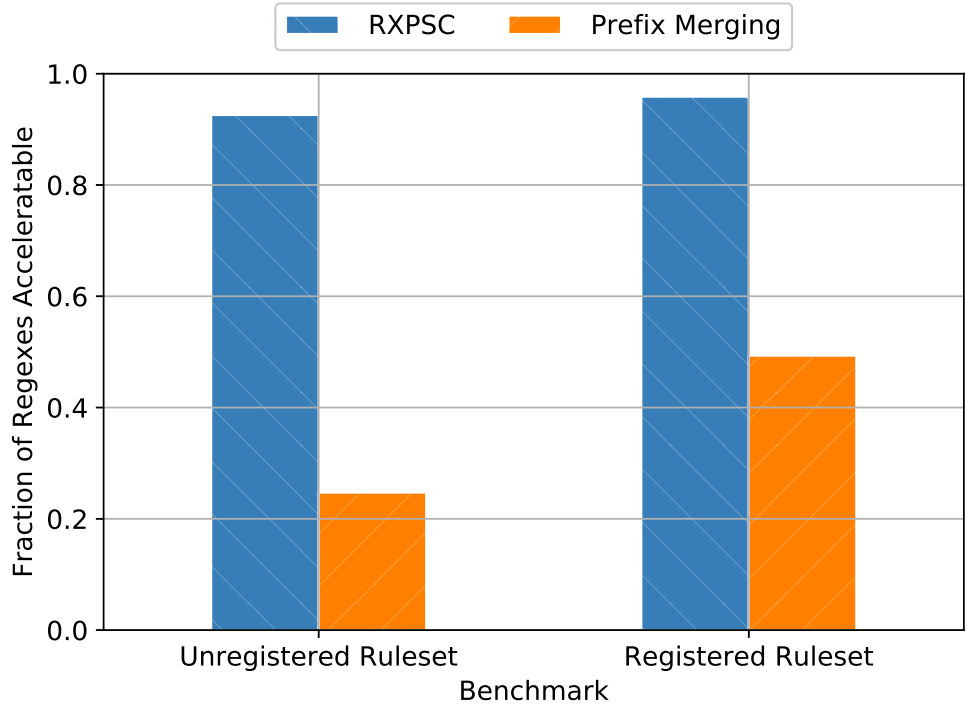


Regular Expression Acceleration

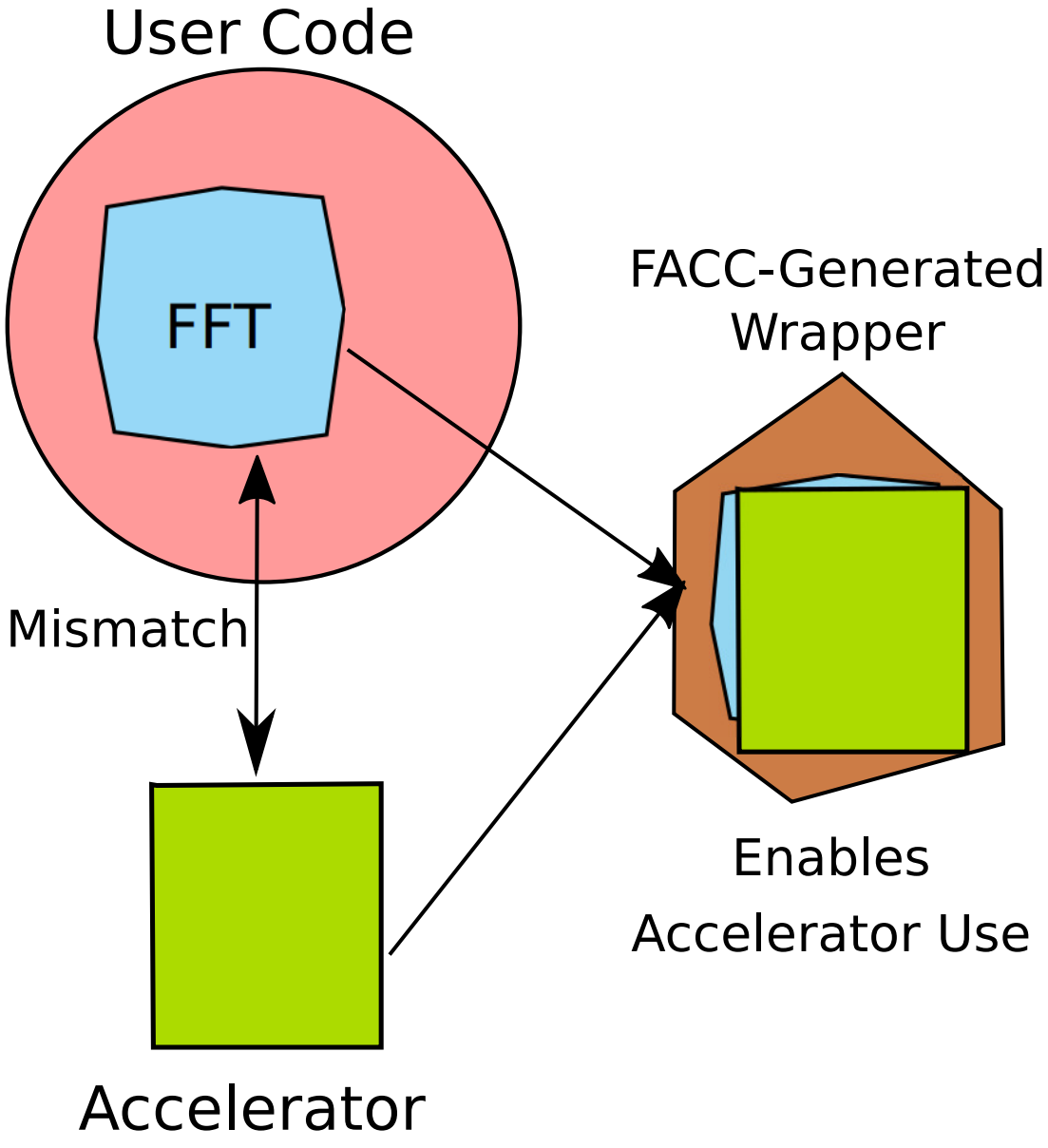


Regular Expression Acceleration

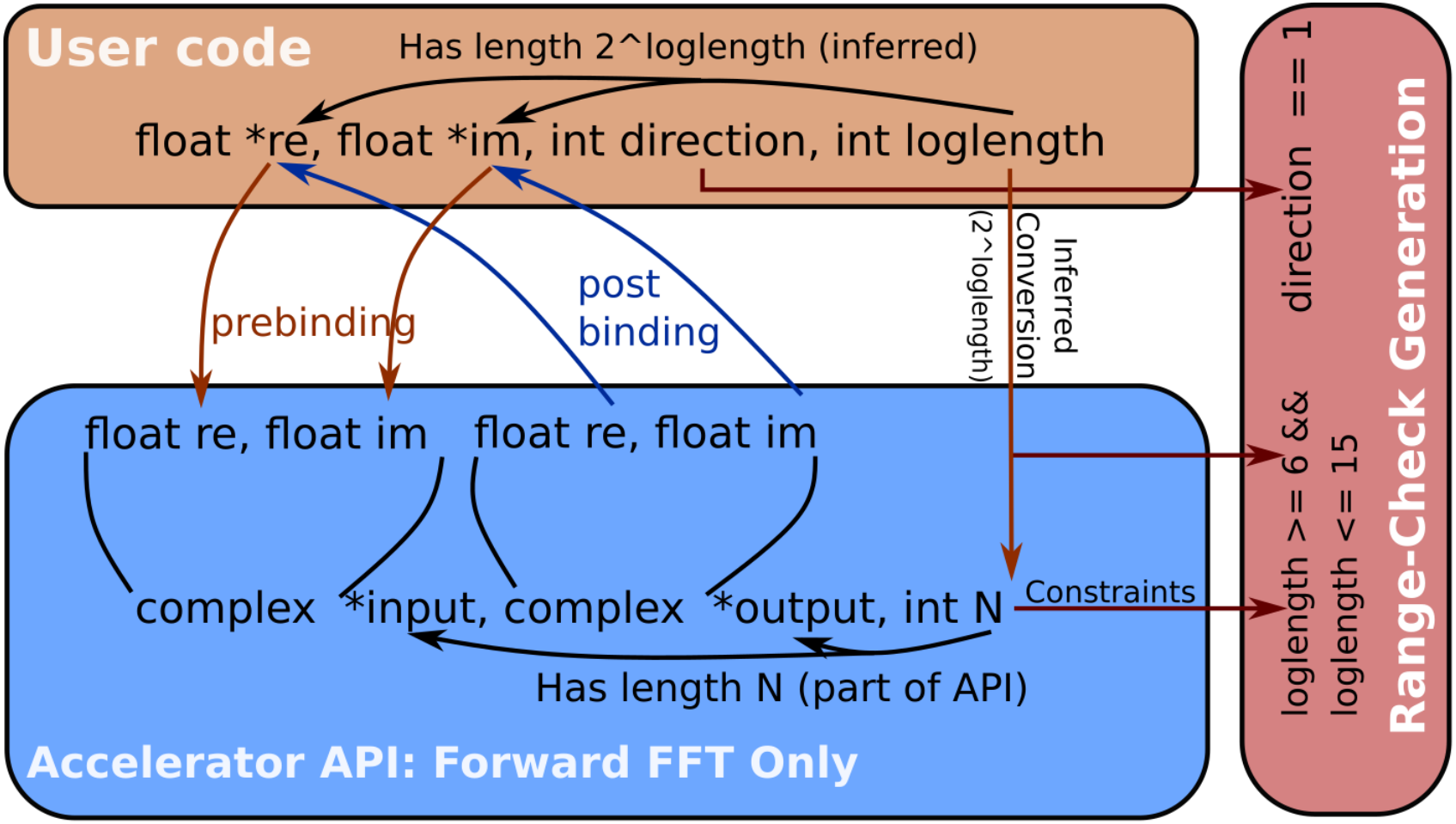




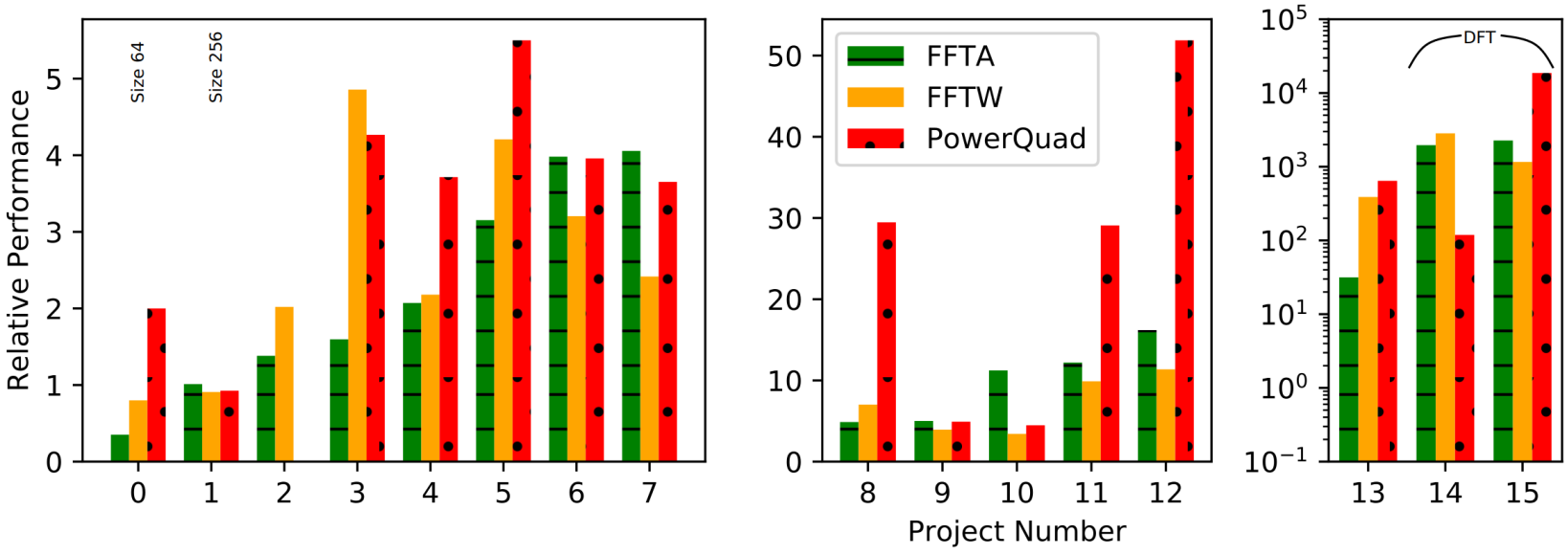
Fourier Transform Acceleration



Fourier Transform Acceleration: Method



Fourier Transform Acceleration: Results



Conclusion

- Hardware accelerators lack:
  - Portability
  - Ease-of-use
  - Integration into software-based development pipelines
- Solutions to close the gap between software programming and hardware accelerators required