



# Designing Domain Specific Computing Systems

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Shift the paradigm away from  
**general purpose**  
to  
**domain specific  
computing**



**Our contribution is to develop  
a method to**

**(1) inform domain specific  
hardware design**

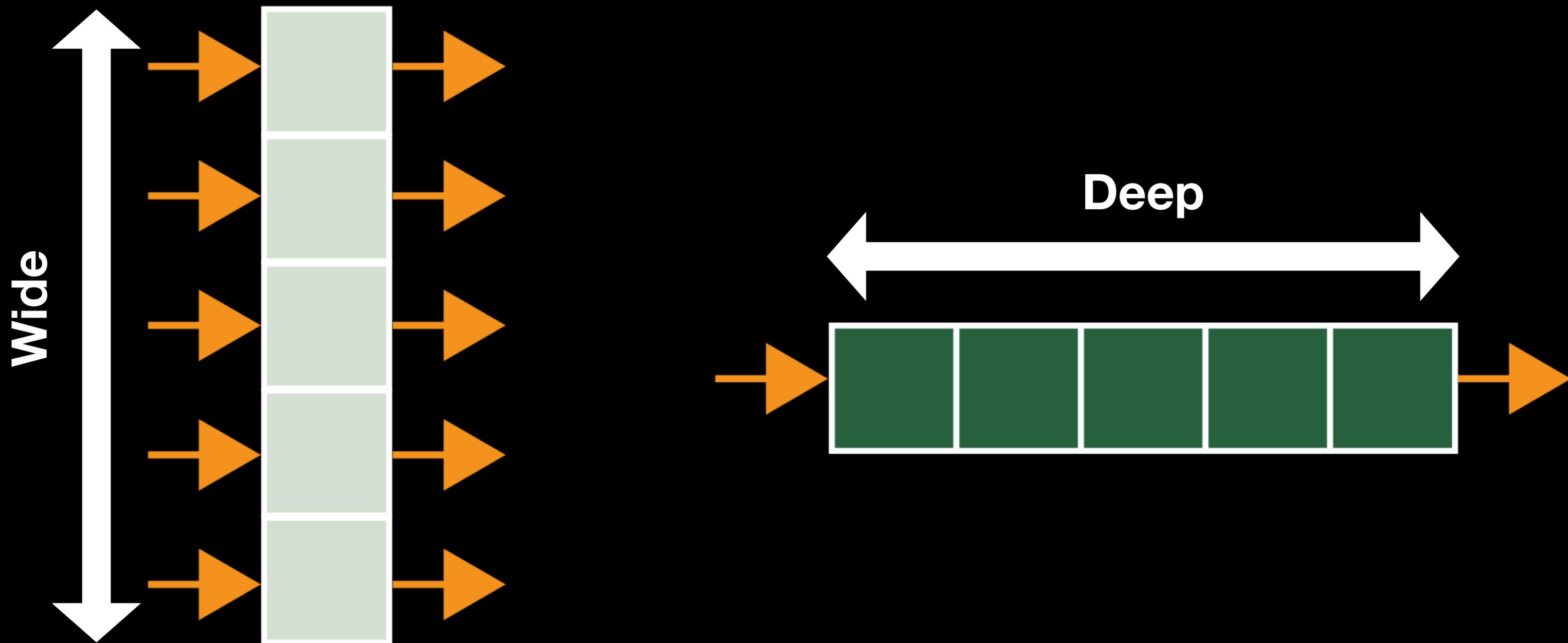
**through**

**(2) quantitatively characterize  
a domain**



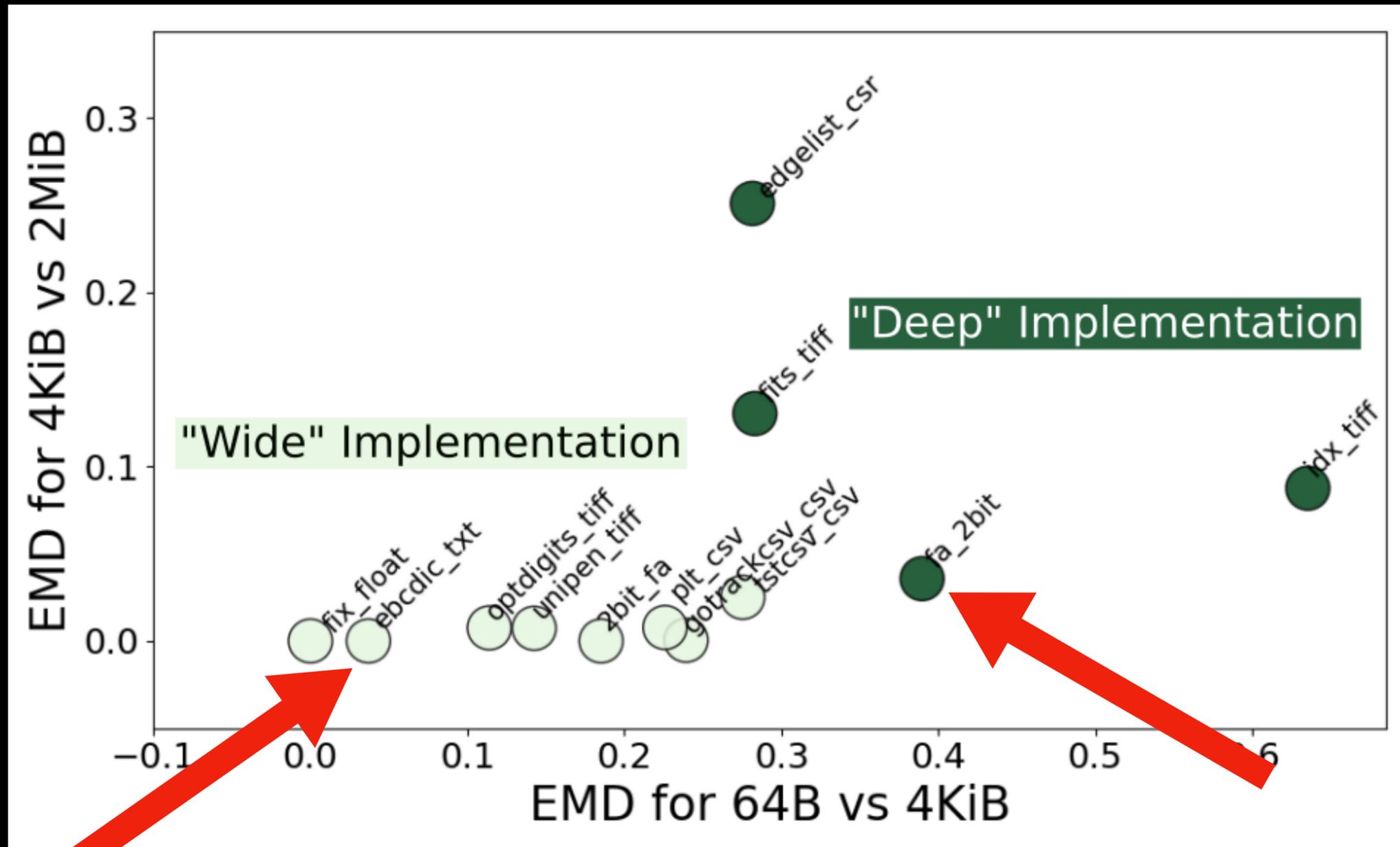
# Width (MWI) vs. Depth (SWI)

## The two OpenCL FPGA Design Paradigms



# Clustering Data Integration Benchmarks\*

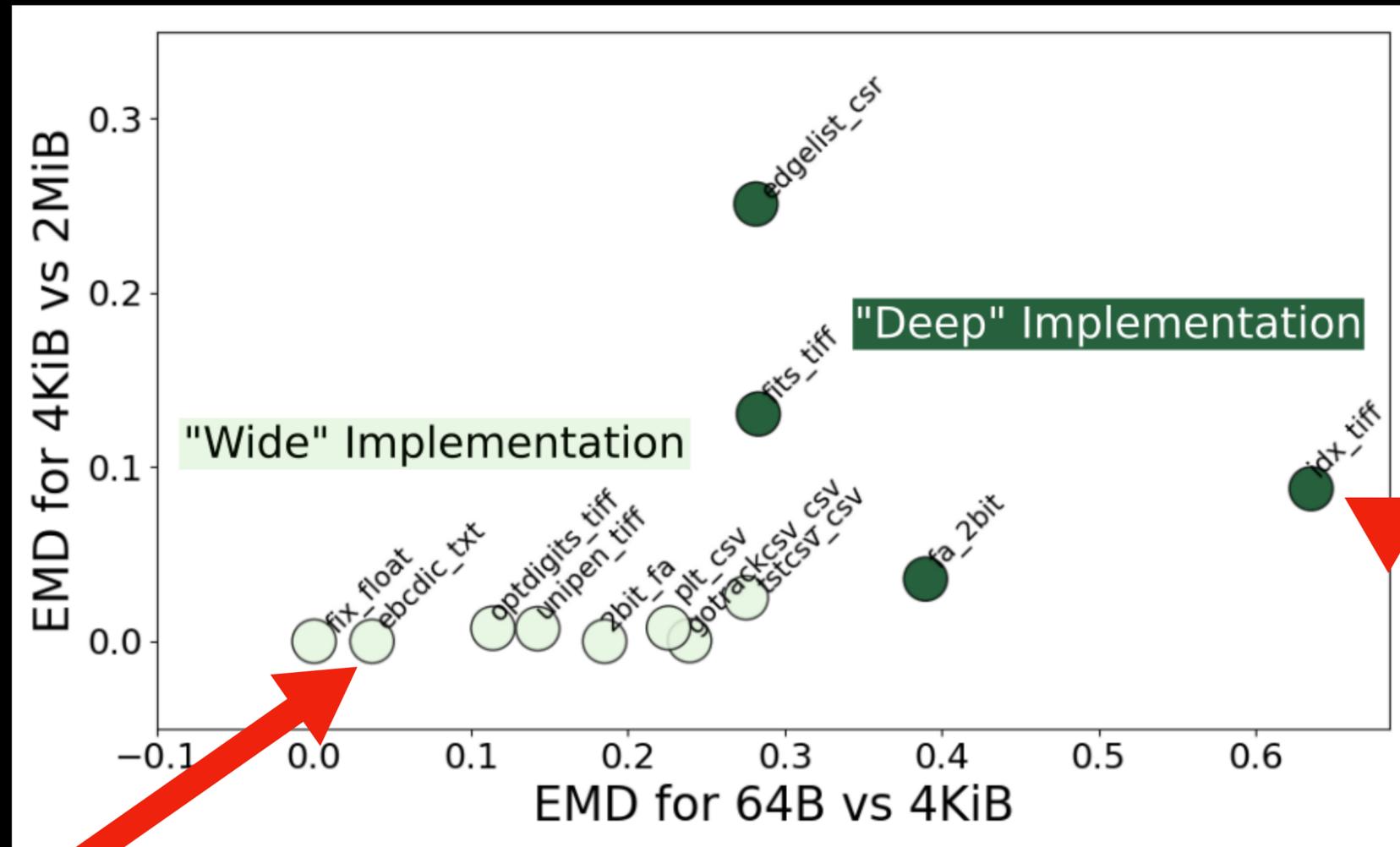
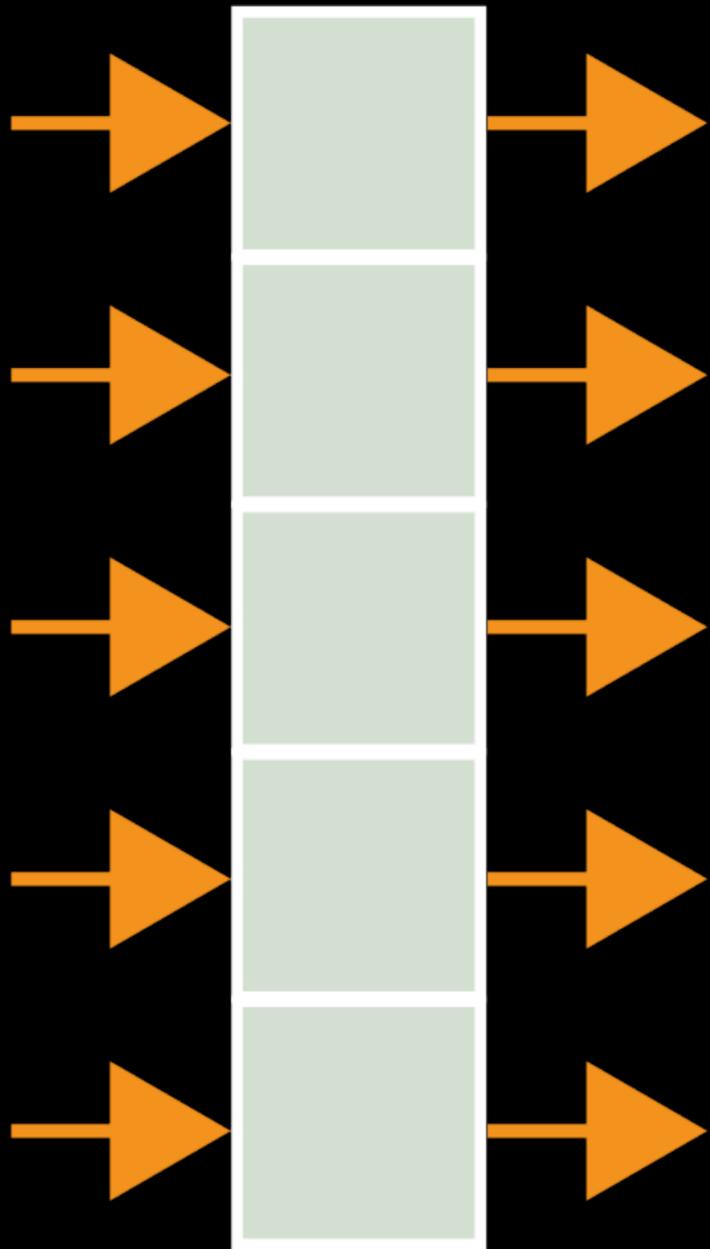
A *k*-means clustering using locality measures<sup>†</sup> as features



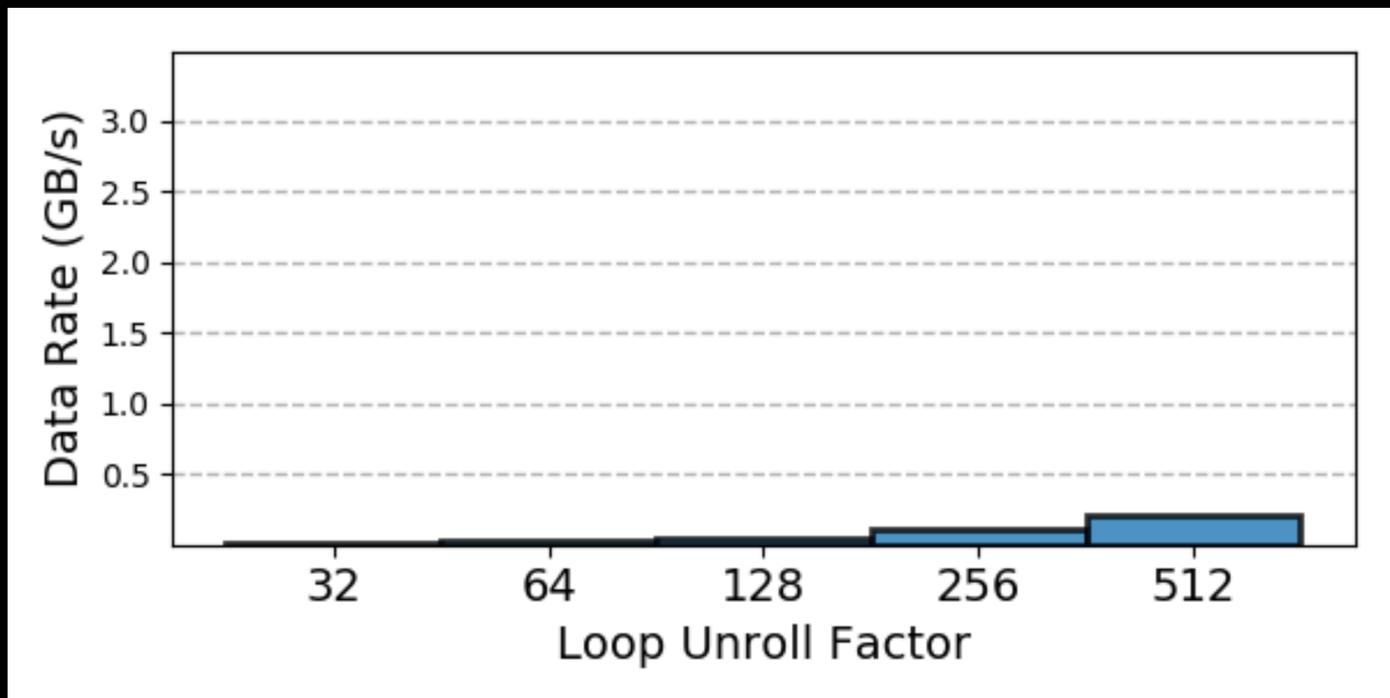
\*[ICPE 2018]  
†[HPEC 2019]

# *k*-means Clustering

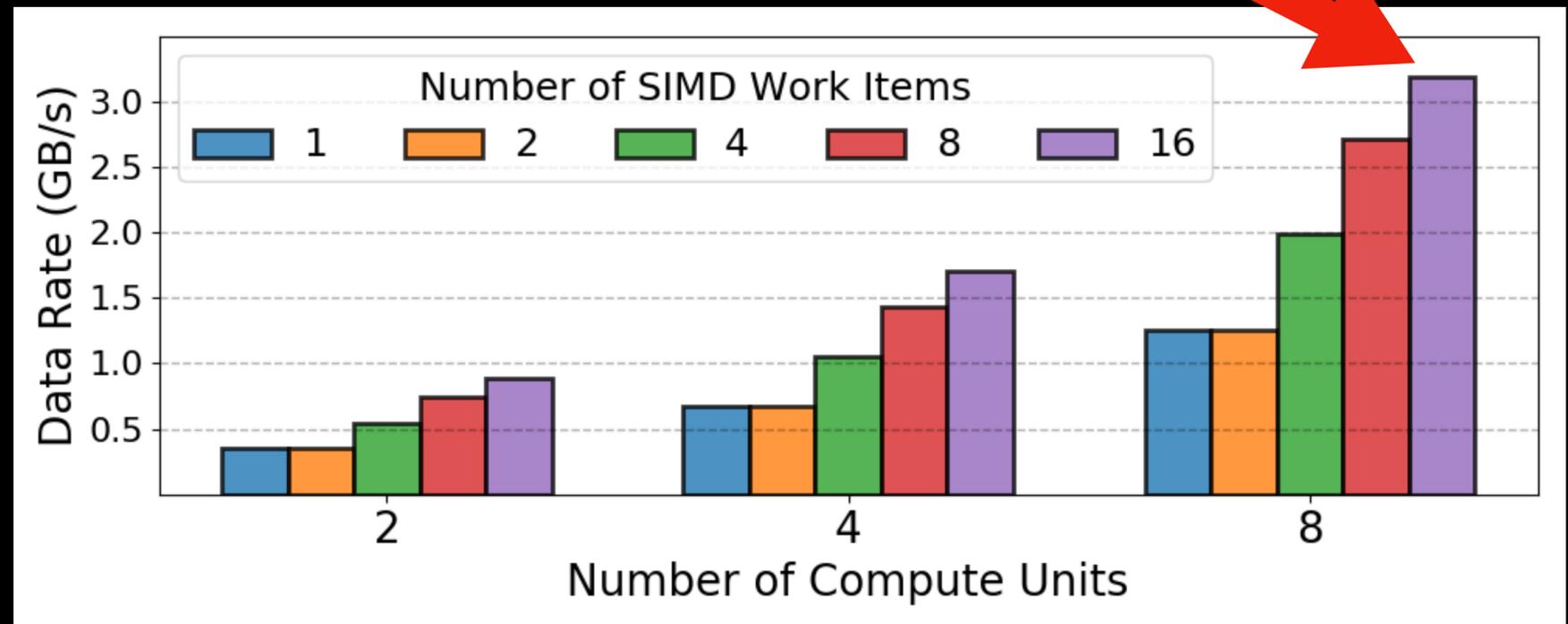
To answer the design choice



# *e\_bcdic\_txt* Data Rates

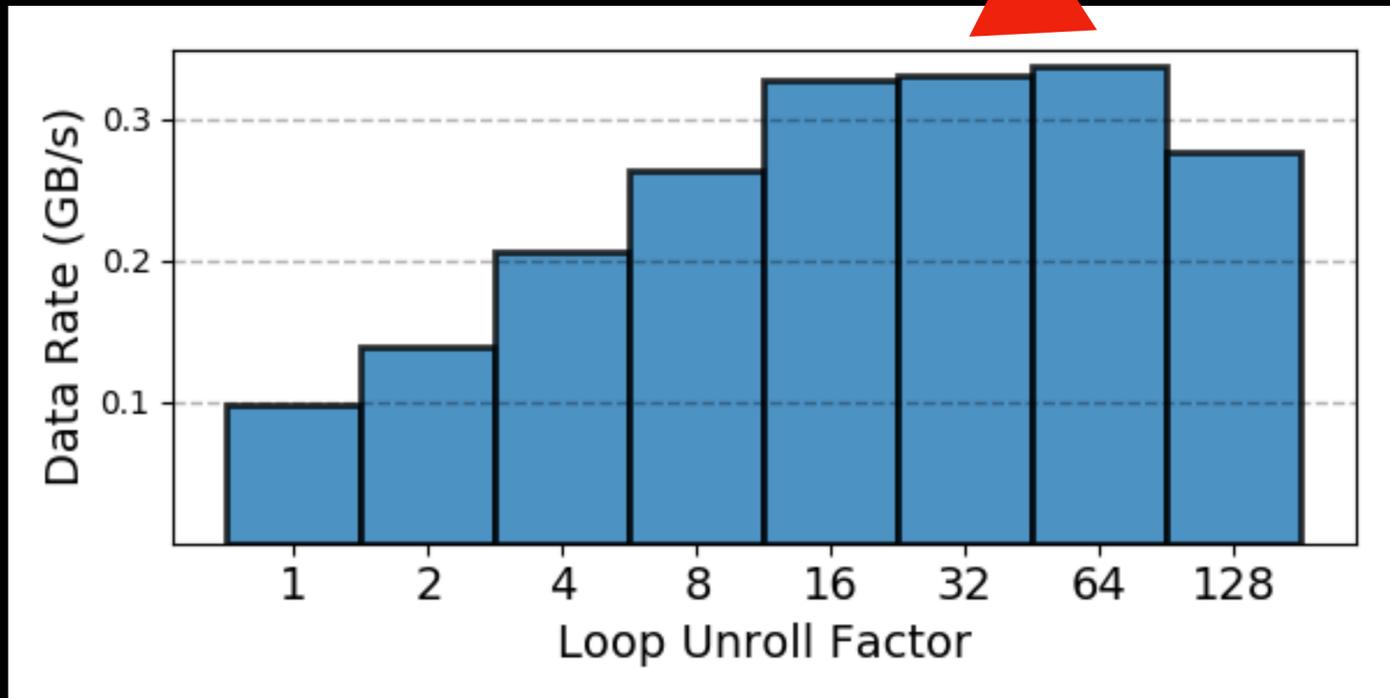
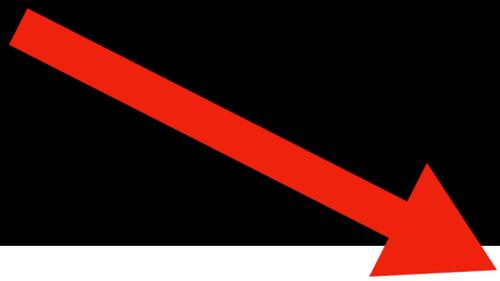


**SWI Result**

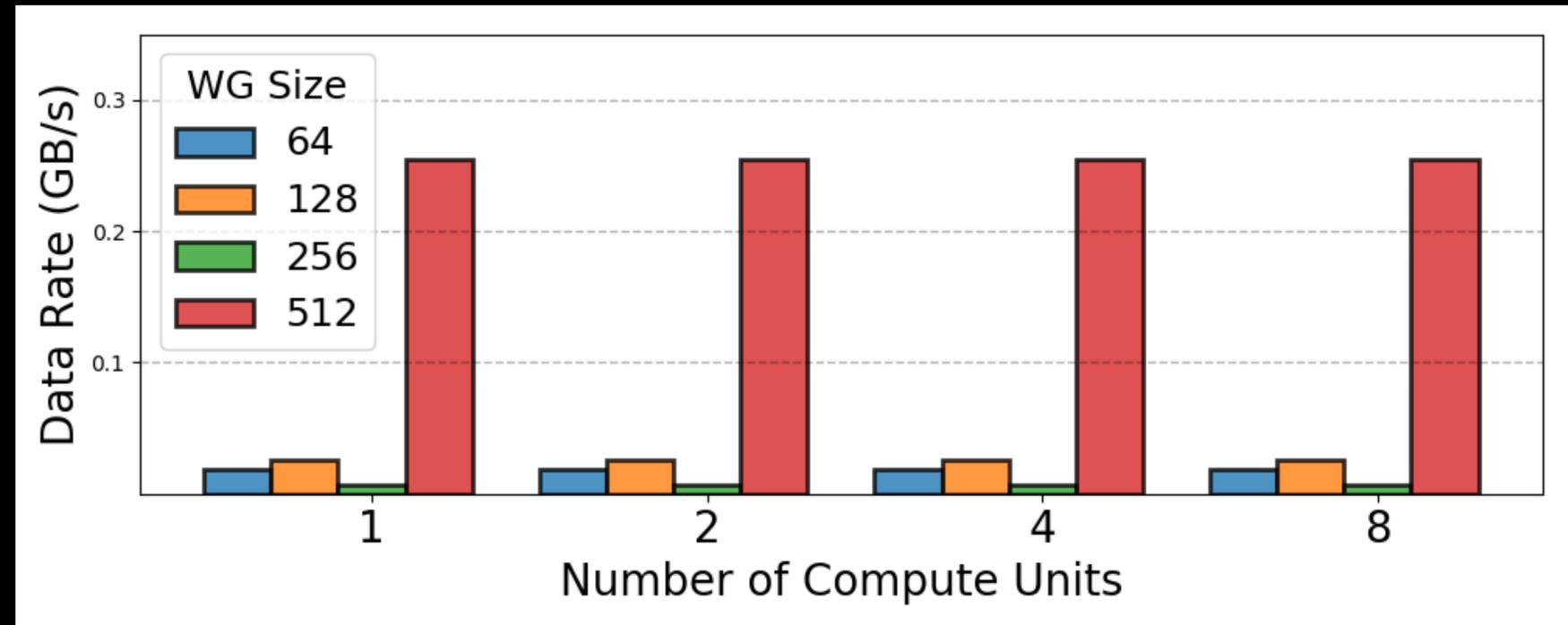


**MWI Result**

# *idx\_tiff* Data Rates



**SWI Result**



**MWI Result**



# Conclusion:

(1) informing the design of either a widely vectorized or deeply pipelined OpenCL FPGA compute unit

through

(2) Clustering applications using locality measures as features shows promise

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