encrypt

A scalable and practical privacy-preserving framework

Hardware Acceleration

GPU Acceleration for Fully Homomorphic Encryption

Why GPU for FHE?

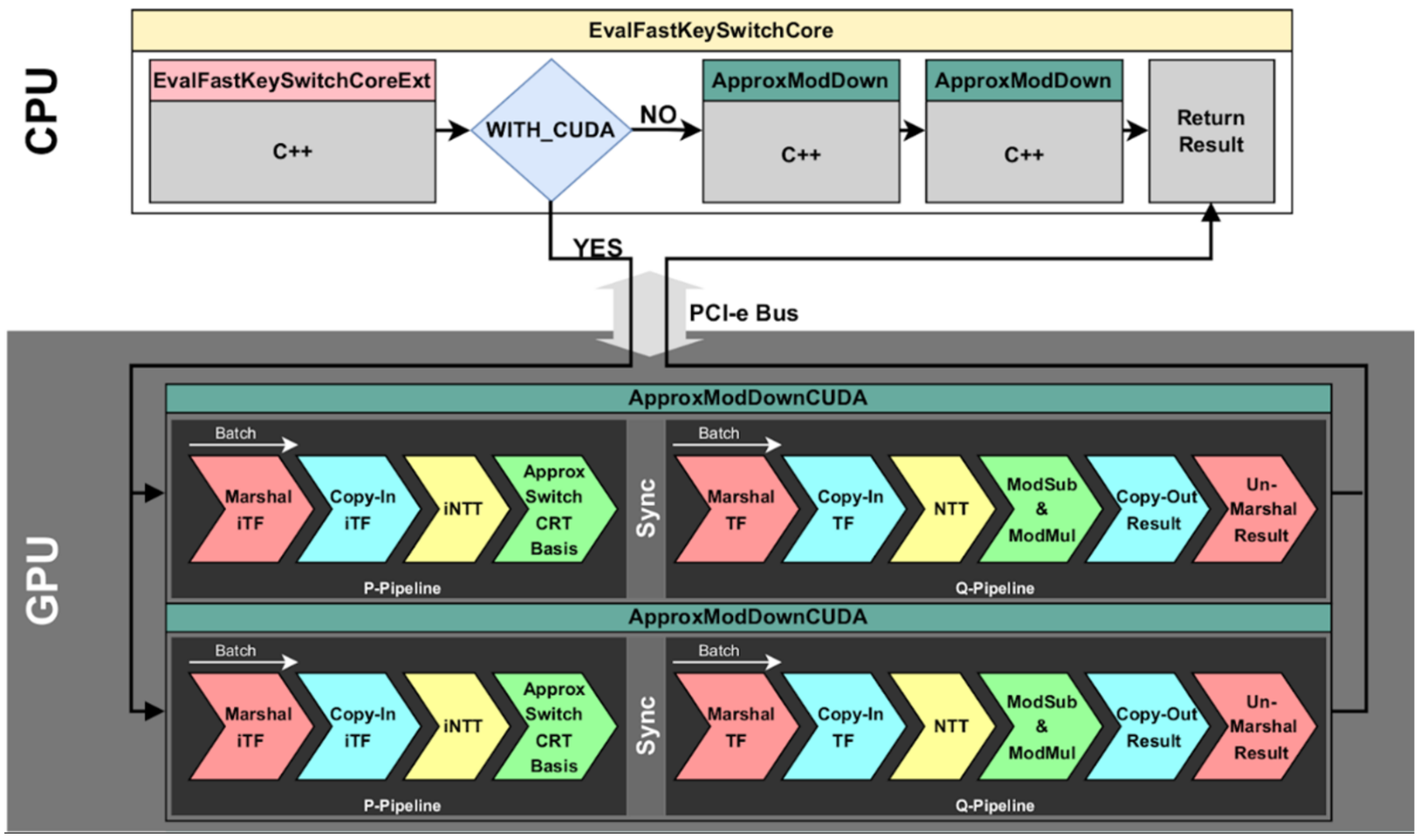
- FHE is secure but computationally intensive
- GPUs excel at parallelism → ideal for speeding up FHE
- No existing GPU support for BGV in OpenFHE → we fill that gap

What we Did?

- Profiled OpenFHE → identified bottlenecks
- Offloaded code to GPU
- Enabled 128-bit integer support
- Integrated seamlessly into OpenFHE
- Reduced data transfer cost using batch

Metric	Description
Speedup	4.58×
End-to-End Speedup	1.08× (depth 24)
Throughput Gain	+16%
Bottleneck at Low Depths	Data transfer & marshaling

Open Source Repository



Key Takeaways

- Best suited for deep FHE workloads
- Modular integration with OpenFHE
- Data movement optimization is key
- Enables real-world GPU-secure computing

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