HYPER-ACCELERATION WITH SAMSUNG SMARTSSD

Bigstream Acceleration Stack

- Zero code change
- Cross platform
- Ease of installation
- Intelligent, automatic computation slicing
- Hybrid acceleration

Dataflow Adaptation Layer
- Dataflow Compiler
- Hypervisor
- Many-cores
- GPU
- FPGA
- SmartSSD

Big Data Platforms
- presto
- kafka
- Spark
- MySQL

Bigstream Integration with Spark

- Client Spark Application
- Application Master
- Driver
- Physical Plan
- Task (Standard or Hyper-accelerated)
- Resource Manager
- Resource management messages
- Data-Flow Compiler
- HW Accelerator Adapter

Results on SmartSSD

Single Node Results for Top-15 TPC-DS on SmartSSD
- Vanilla Spark Runtimes
- Bigstream Spark Runtimes

Query Number
- 68, 8, 34, 73, 46, 19, 56, 33, 60, 76, 5, 36, 37, 49, 65
- Time(s)
- 0, 500, 1000, 1500, 2000

4 Node Cluster Results for Top-15 TPC-DS on SmartSSD
- Vanilla Spark Runtimes
- Bigstream Spark Runtimes

Query Number
- 68, 8, 34, 73, 46, 19, 56, 33, 60, 76, 5, 36, 37, 49, 65
- Time(s)
- 0, 50, 100, 150, 200, 250

Performance scales with data

Speedup: 
- 2x to 10x

CPU performance with standard SSD

DRAM - CPU - PCIe - SSD Controller - NAND

Samsung SmartSSD

- Hardware Acceleration for business logic
- High scalable I/O and bandwidth between FPGA and SSD
- Processing and bandwidth scales with data

Value Propositions:
- TCO Savings
- High Spark Performance
- Ease of installation