ReThink with ReRAM

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Data is the New Air

Wherever you go,
data is available at all times

- Data is everywhere
- Latency of cloud-based storage suffocates businesses
- Distributed data pods are the solution
- Relevant data available at all times

ReThink
Traditional Electronic Systems Design

The new user experience for digital societal transformation

- AI is here:
  - Millions of faces at Facebook
  - Pattern recognition for fraud protection
  - Targeted advertisements
- Rethink systems architectures with new technologies
  - Massively parallel systems to process smaller pieces very fast
  - Tightly coupled CPU & storage subsystem on a single die

Systems Will Always Be ON

Machine learning as data moves

- The fabric of learning systems is always “on”
- Energy consumption is a primary concern
- Wake up instantly and shut down without losing data is key

ReRAM-Based Neurons
Self-Program and Self-Configure

Lines between computing and storage blur

- Unacceptable latency of standard bus
  - Performance degradation
  - Energy consumption
  - Security risks
- Overhead introduced by the managing Compute/Storage

1. Moving the memory subsystem on-chip: **ReRAM is embedded with SoC in any CMOS fab**
2. Blurring the lines between computing and storage: **ReRAM-based neurons will self-program and self-configure SOFTWARE and HARDWARE**

The Birth of a New Computing Revolution

- Integrated compute/storage subsystems removing the limitation of bus interfaces
- Low latency, low energy, intelligence to act and adapt rapidly

Rethinking new system designs with ReRAM advantages

- Massive data generated by Multimedia, IoT, and social applications + number of users and devices is growing daily
- Faster, denser, lower latency Enterprise storage
- Smarter Internet of Things that can last years on a single battery
- New wearable devices with significant on-chip storage and performance

ReRAM Everywhere

- Speed processing, storage and retrieval
- Replace flash-based SSDs and DRAM

- ReRAM will be everywhere - data centers in the cloud, devices in the edge
- 3D ReRAM arrays replaces traditional Flash-based SSDs to speed up data processing, storage and retrieval, smaller form factors, lower energy consumption
- With ReRAM, sub 5 ns latencies are possible in architectures delivering GIOPs/U

ReThink
with ReRAM

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- 40nm to 7nm
- Bridging CMOS and memory on same progress node
- New SoC architectures for next wave of digital transformation

Growing ecosystem of hardware and software partners rethinking and creating new ReRAM-centric architectures for the new world of artificial intelligence and machine learning