The Path Forward

• **Research Needed to Achieve Exascale Performance**

  • Extreme voltage scaling to reduce core power
  • More parallelism 10x – 100x to achieve target speed
  • Re-architecting DRAM to reduce memory power
  • New interconnect for lower power at distance
  • NVM to reduce disk power and accesses
  • Resilient design to manage unreliable transistors
  • New programming models for extreme parallelism
  • Applications built for extreme (billion way) parallelism