IBM Blu Acceleration

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What is Blu?

• A set of optimizations to make DB2 faster

• In-memory optimized

• Leverages IBM’s competence with hardware
Key Features

• Delayed Materialization

• Exploiting Single Instruction Multiple Data (SIMD) Instructions

• Hardware-aware Parallelization

• Scan-friendly Caching
Delayed Materialization

• Ability to operate on compressed data

• Compression schemes employed
  – Huffman and offset encoding

• Compression process preserves order
  – Same order as the uncompressed data

• Enables optimized comparisons, scans
Exploiting SIMD Instructions

• SIMD: Single Instruction Multiple Data
  – *Same instruction on multiple data elements*

• Blu capable of detecting SIMD hardware support

• *Packs data into CPU registers to exploit SIMD*
Hardware-aware Parallelization

• Parallelization benefits limited by memory access latency

• Map threads to cores aware of
  – CPU-cache affinity
  – Memory affinity
Scan-aware Memory Management

• All data doesn’t always fit into memory

• Problem with LRU memory management policies
  – Fall off a cliff when data does not fit in memory

• *Employs a page replacement policy that preserves part of the working set*