**VAMPIR**

Virtualized Non-Functional Memory Properties for Data-Pipeline Scheduling

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### Data Pipelines

<table>
<thead>
<tr>
<th>SQL Query</th>
<th>Pipeline-based Query Execution Plan</th>
<th>Pipeline Dependency Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>select * from A, C; (select B, z, sum(B::v) from B where B::v3 group by B::v) where A::v7 and C::w8 and A::v = C::v</code></td>
<td><img src="image1" alt="Pipeline-based Query Execution Plan Diagram" /></td>
<td><img src="image2" alt="Pipeline Dependency Graph Diagram" /></td>
</tr>
</tbody>
</table>

### Overall Project Structure and Project Members

- **Data Pipelines**
  - **W4 Understanding Data Pipelines**
  - **W5 Deep Memory Allocation Scheme**
  - **W6 Negotiation and Integration**

### Project Details

**Phase 1 (Single-Query Pipeline Scheduling)**
- **DB:** Efficient algorithms for “heterogeneous memory pipeline orderings” considering NFPs
- **OS:** Abstractions for heterogeneous memories; virtualization + compensation, transparent migration/replacement

**Phase 2 (Multi-Query Pipeline Scheduling)**
- **Global schedule + compensation plan**
- **Negotiation at query compile time**

**Current System Under Test (SUT)**
- Xeon Phi 7250
- NUMA-Nodes
- Heterogeneous Memory
  - DRAM
  - HBM

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**Disruptive Memory Technologies**
- DRAM
- NVRAM
- HBM
- ...