Network-aware Data Management for Disaggregated Memory Systems
Thaleia Dimitra Doudali and Ada Gavrilovska
Georgia Institute of Technology

1. Problem Space

Application in-memory data

hot data

cold data

Data Management Software

Dynamic Data Tiering

Data Migrations

rest of the data

Disaggregated Memory System

2. Challenges

Zero Cost Migrations

Costly Migrations

Time to migrate the pages > Time to access them from remote memory.

1. How to predict which application data to migrate?
[Kleio\(^1\) - HPDC ’19 - best paper award finalist]
2. How to predict the performance curve for zero cost migrations?
[Mnemo\(^2\) - HPBDC workshop of IPDPS ’19]
3. How to predict the performance curve for costly migrations?
[Work In Progress]

3. Solution

Application in-memory data

Dynamic scheduling of data migrations based on memory and network load

Explicit management of data migration traffic

4. Implementation

e.g. SPEC, Parsec Benchmarks

Workload

Memory Hierarchy Simulation

Intel Pin Binary Instrumentation and Cache Simulation

Simulate Network Traffic:
- Memory Requests
- Data Responses
- Data Migrations

Memory Network Simulation

Evaluation Metrics:
- Average Data Response Time
- Bandwidth Utilization

Goal
Optimize Application Performance

Method
Maximize Local Memory Accesses

How
Managed bursts of Data Migrations
