

Structured Peer-To-Peer Resource Discovery for Computational Grids

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Agenda

- Scope
- Highlights
- System Layout
- Operation
- Implementation
- Results
- Conclusions



Scope

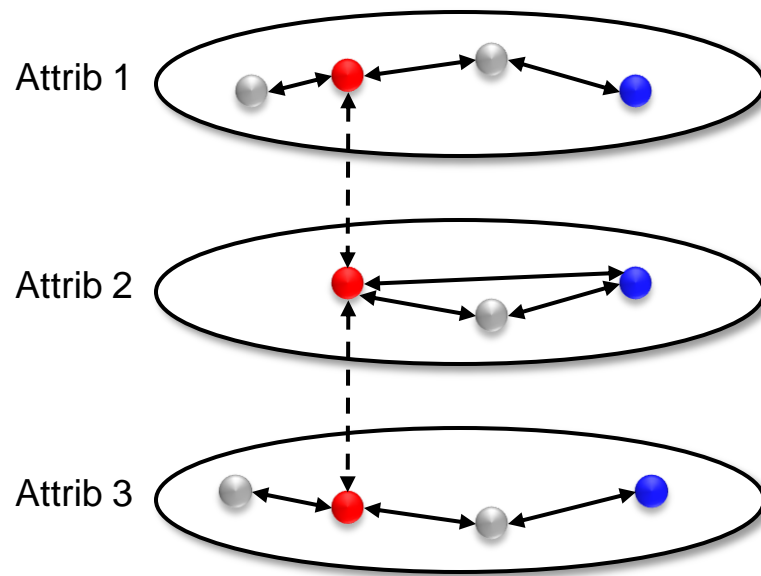
- Resource discovery for medium to large V.O.s
- Potentially unreliable environments
- Can be used as adjunct to current resource-discovery systems
- Currently implemented as simulator



System Highlights

- Based on Pastry
- Multiple layers – attribute based
- Attribute “threshold” determines layer participation
- Connected by gateways
- Multicast within layers

System Layout



Legend

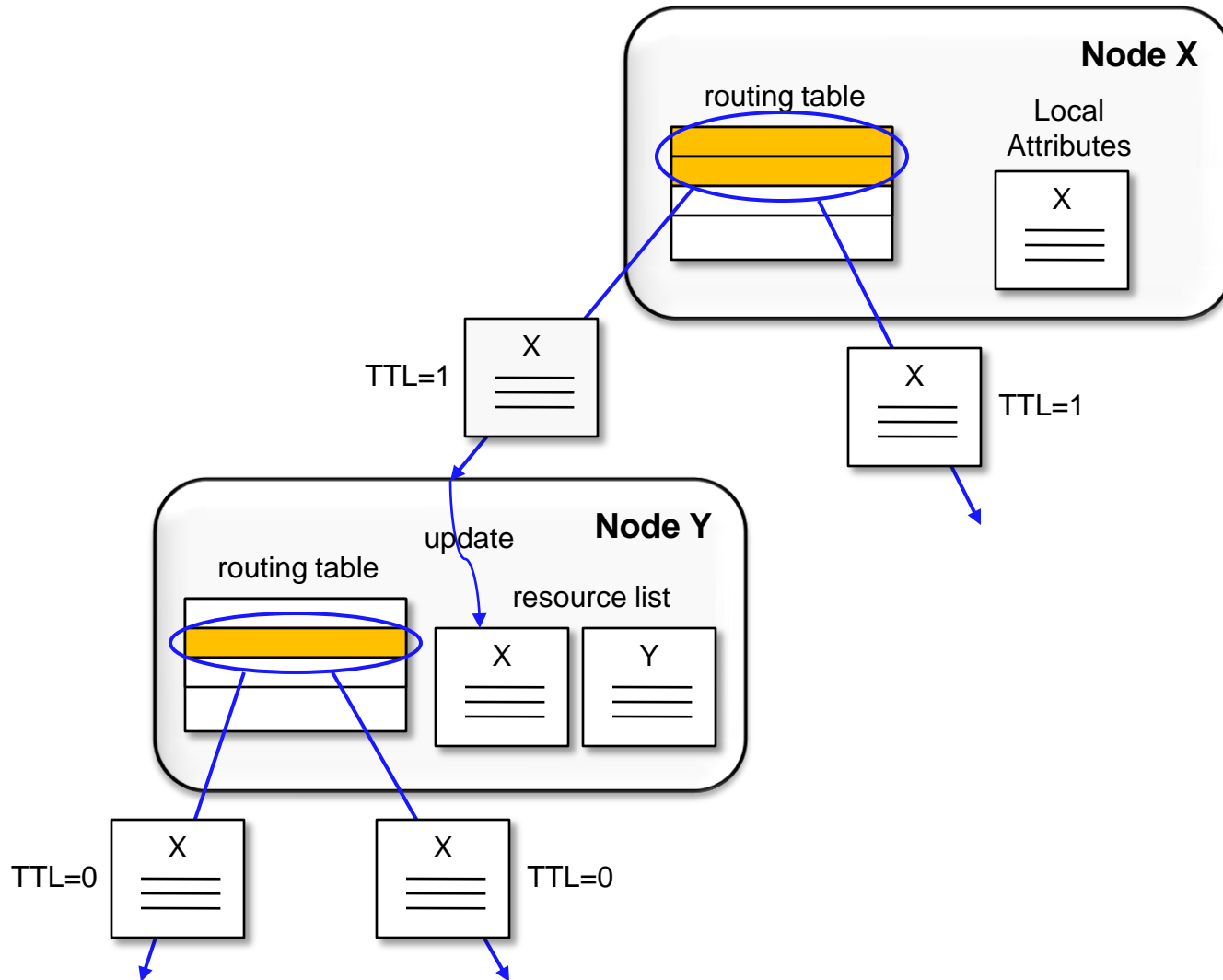
- Seed Node
- Gateway Node
- Client Node



System Operation – Intra-layer

- Restricted multicast
- Utilizes top layer(s) of Pastry routing table
- Tunable via:
 - Number of rows
 - Percentage of nodes in row
 - Hop count

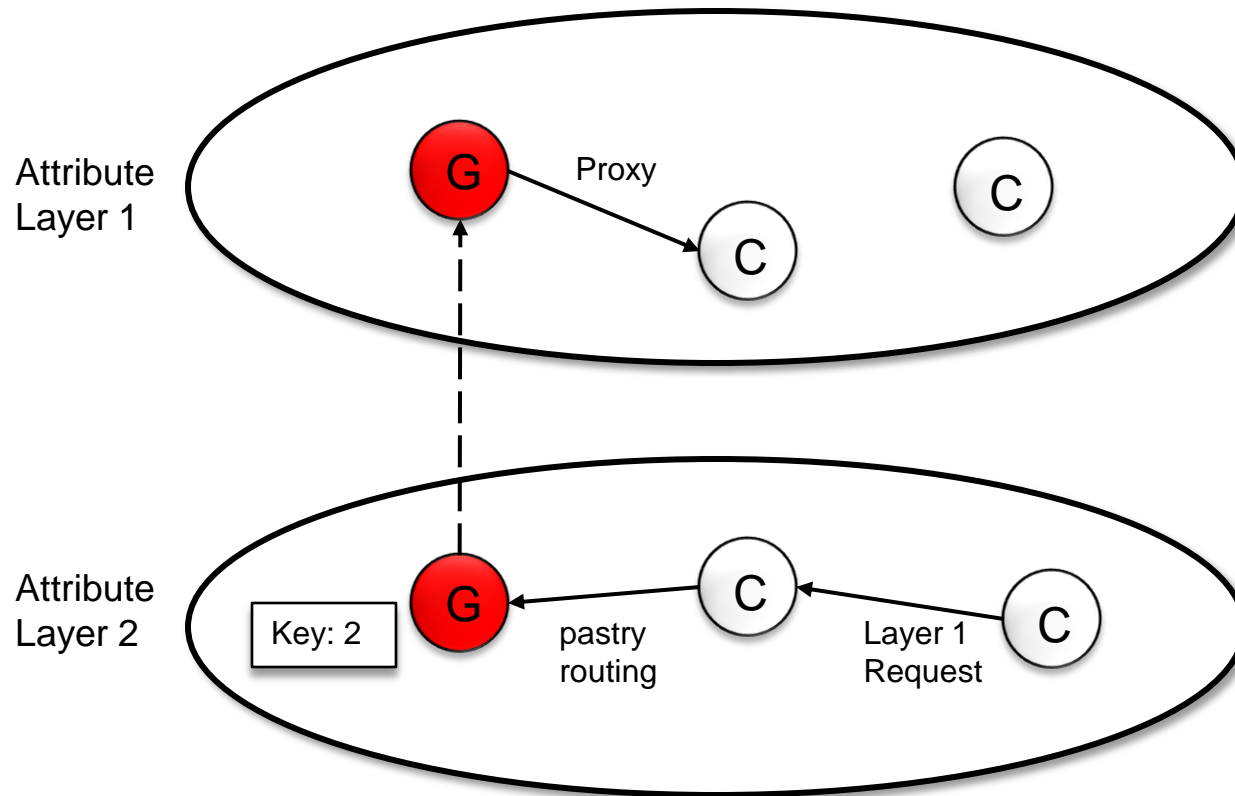
Intra-layer Multicast



System Operation – Inter-layer (I)

- Routing via Pastry
- Gateway types:
 - Designated – assigned gateways keys
 - Non-designated – attributes on multiple layers
- Gateways act as one-way exits
- Designated gateways assigned via seed nodes
- Replicated using Pastry mechanisms

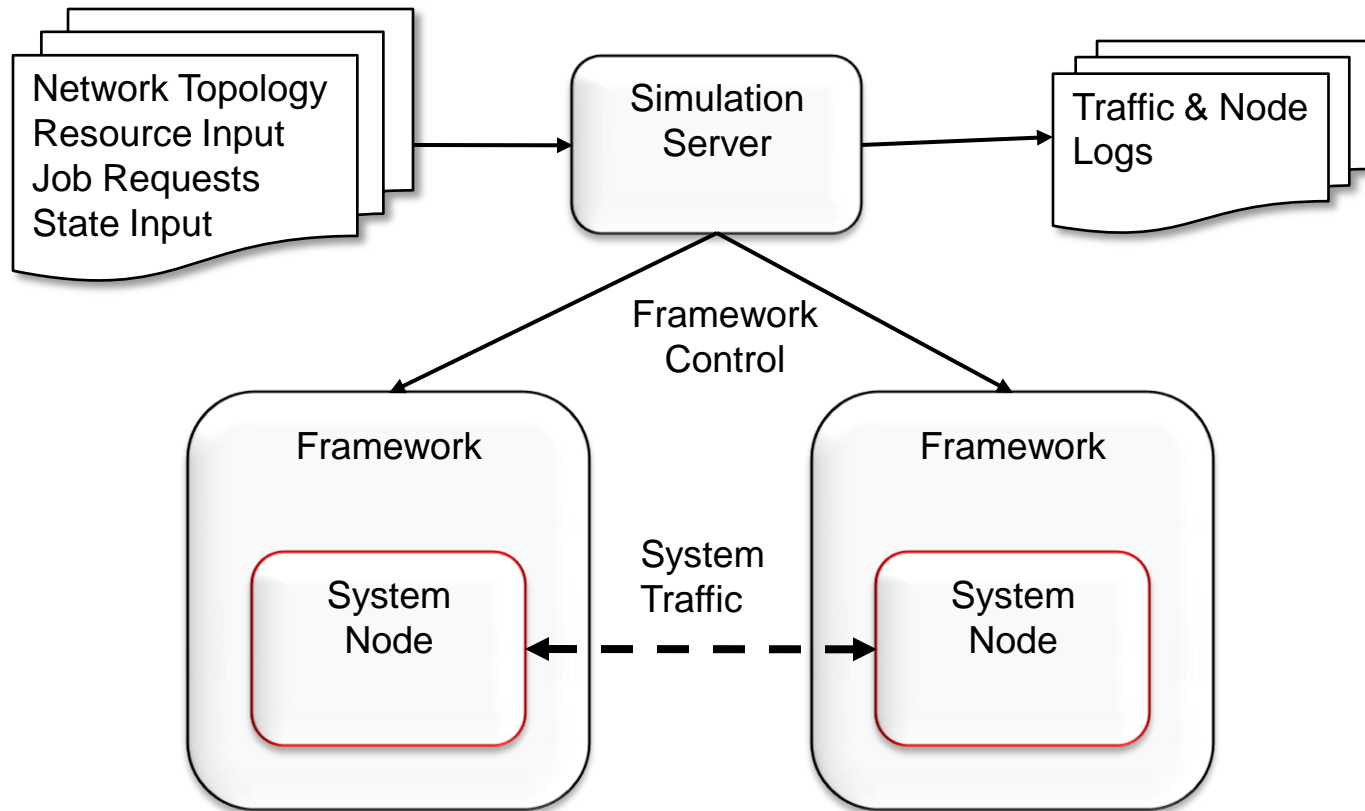
System Operation – Inter-layer (II)



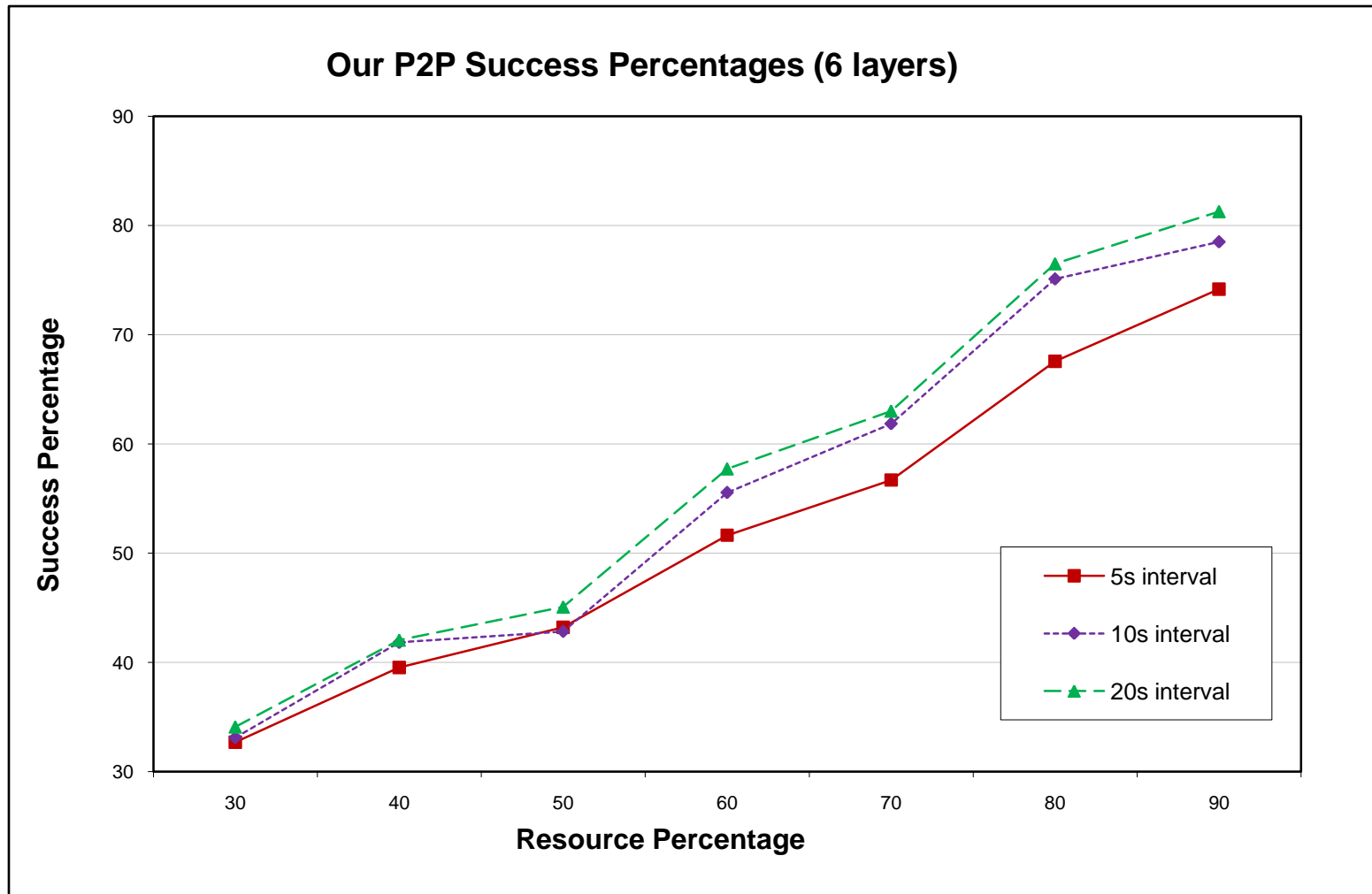
System Implementation (I)

- Simulator written in Java©
- Power-law network topology
- Tested 1 & 6 attribute layers
- Varying system sizes (20-60 nodes)
- 100 test jobs per node, varying intervals
- Recorded:
 - Job success rate
 - Traffic

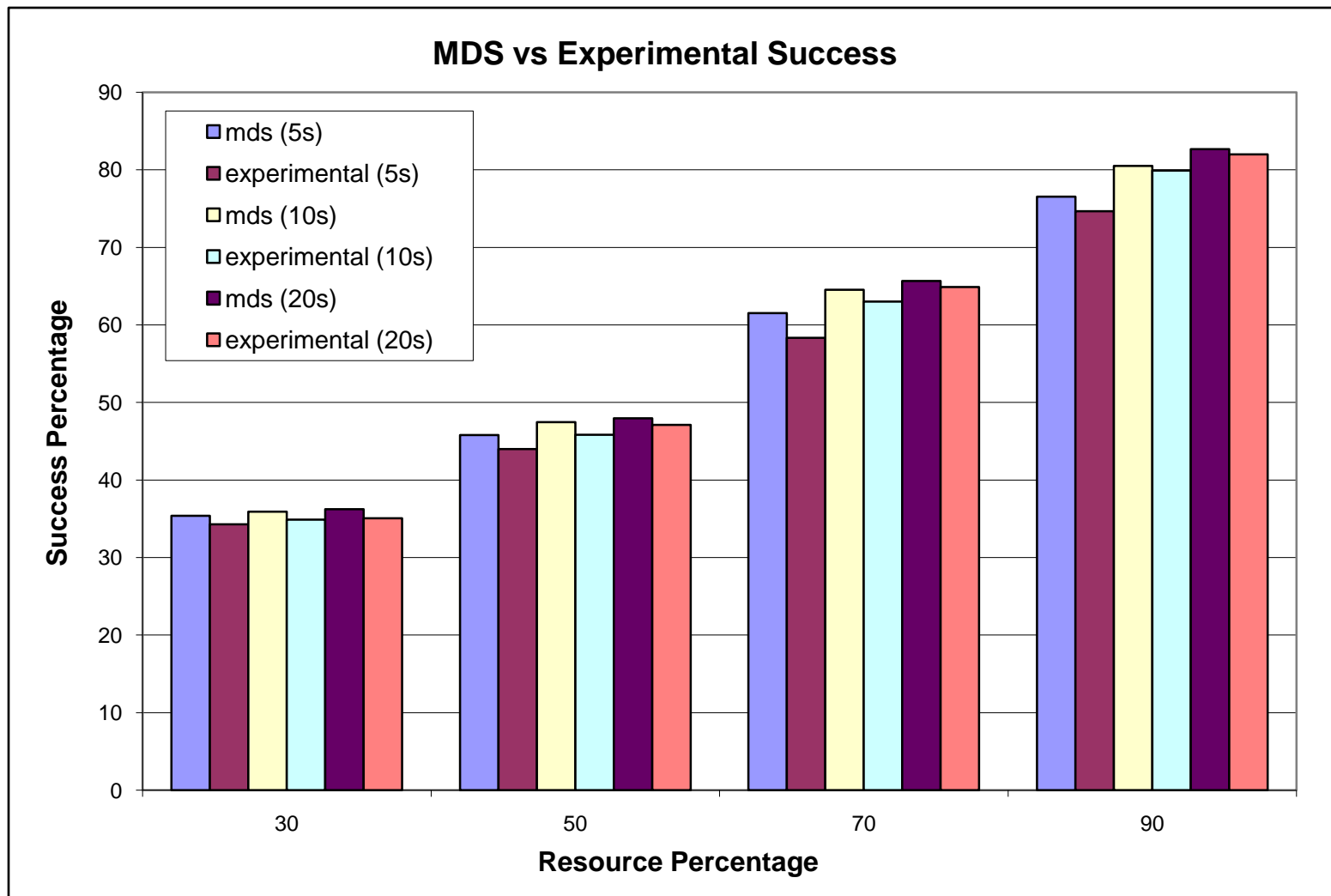
System Implementation (II)



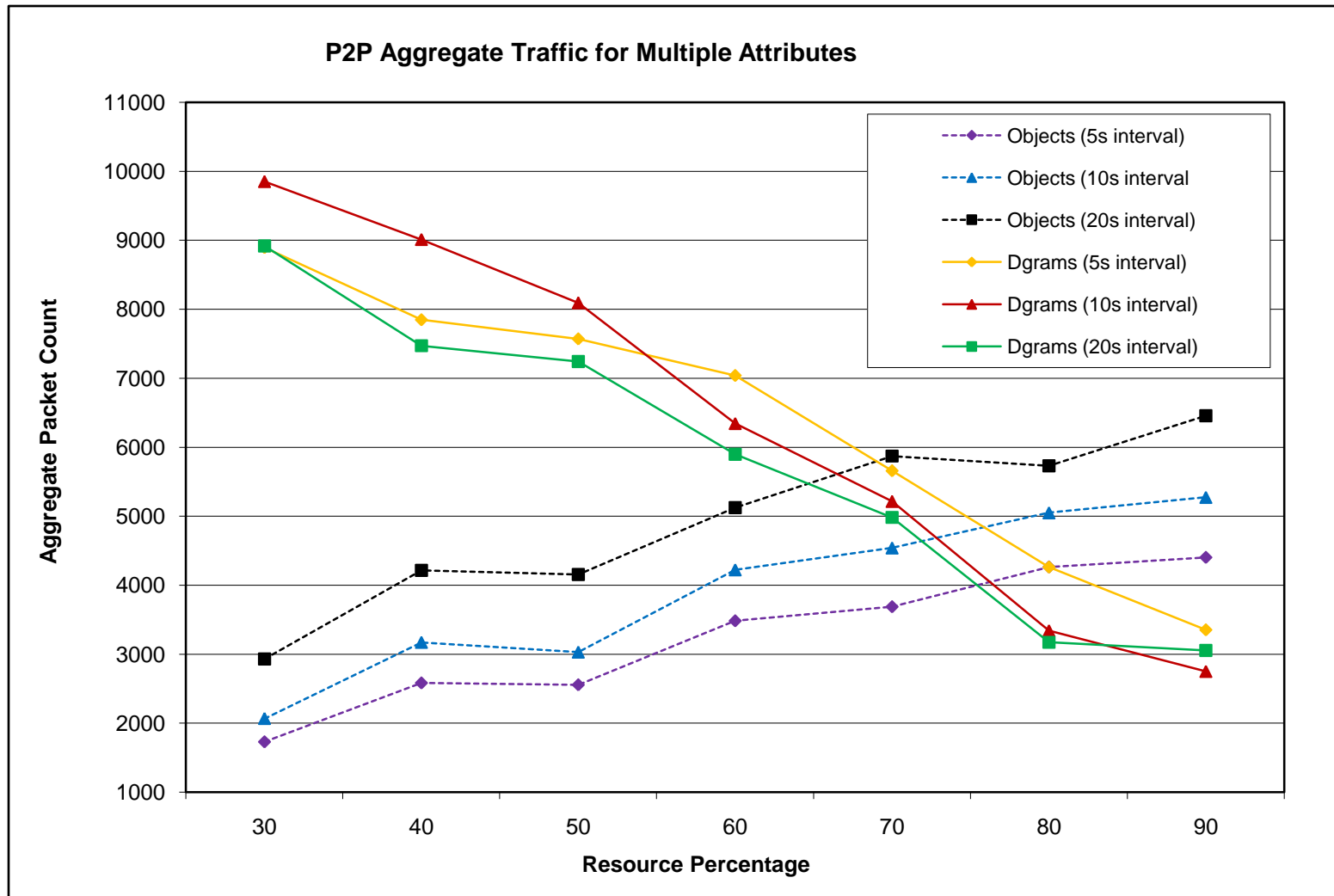
Results (I)



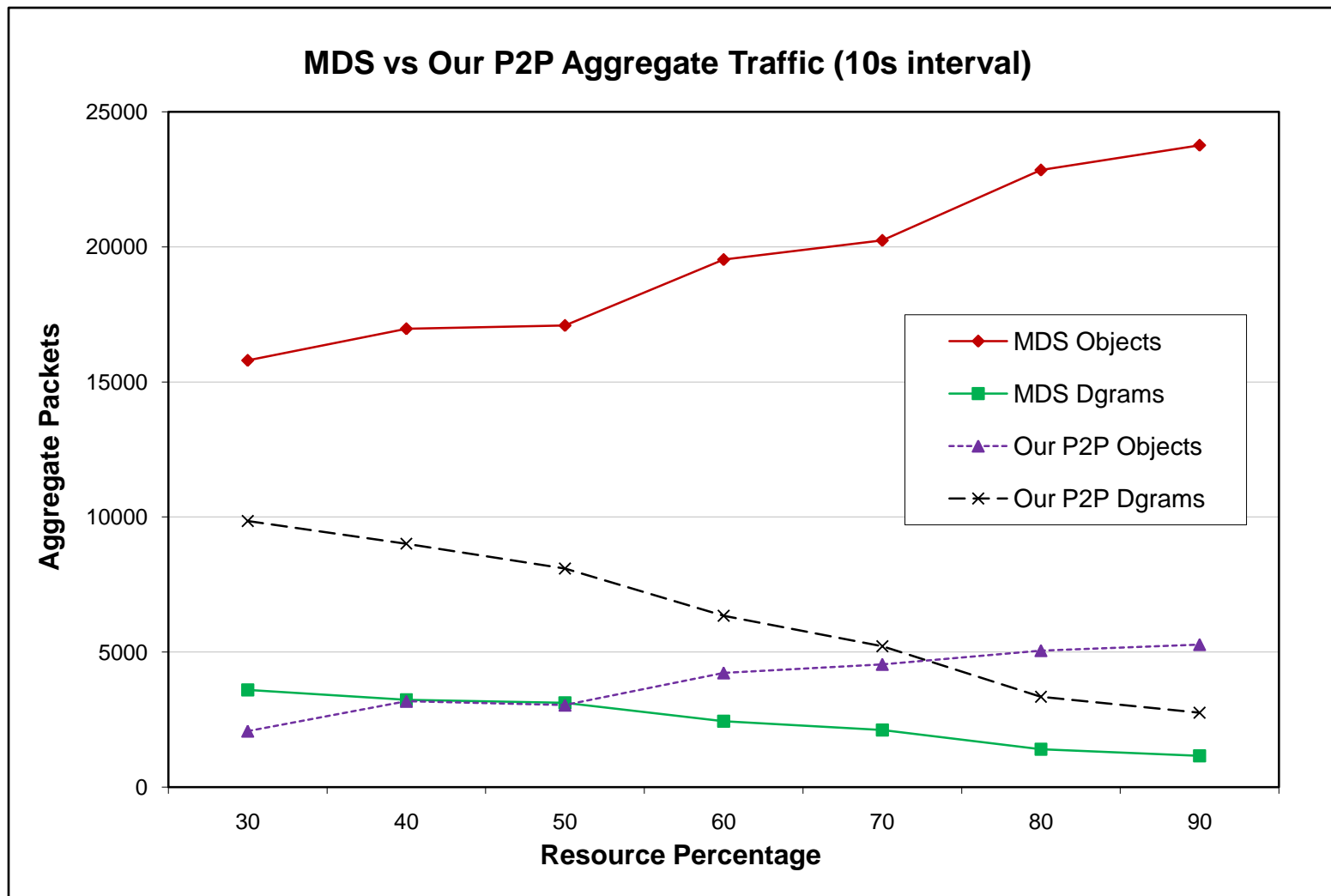
Results (II)



Results (III)



Results (IV)





Conclusion & Further Work

- Findings:

- Comparable success rates to MDS
- Reduced Traffic

- Improvements:

- Multiple attribute ranges
- Range query support

- Other:

- Tests with larger set sizes
- Live implementation



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