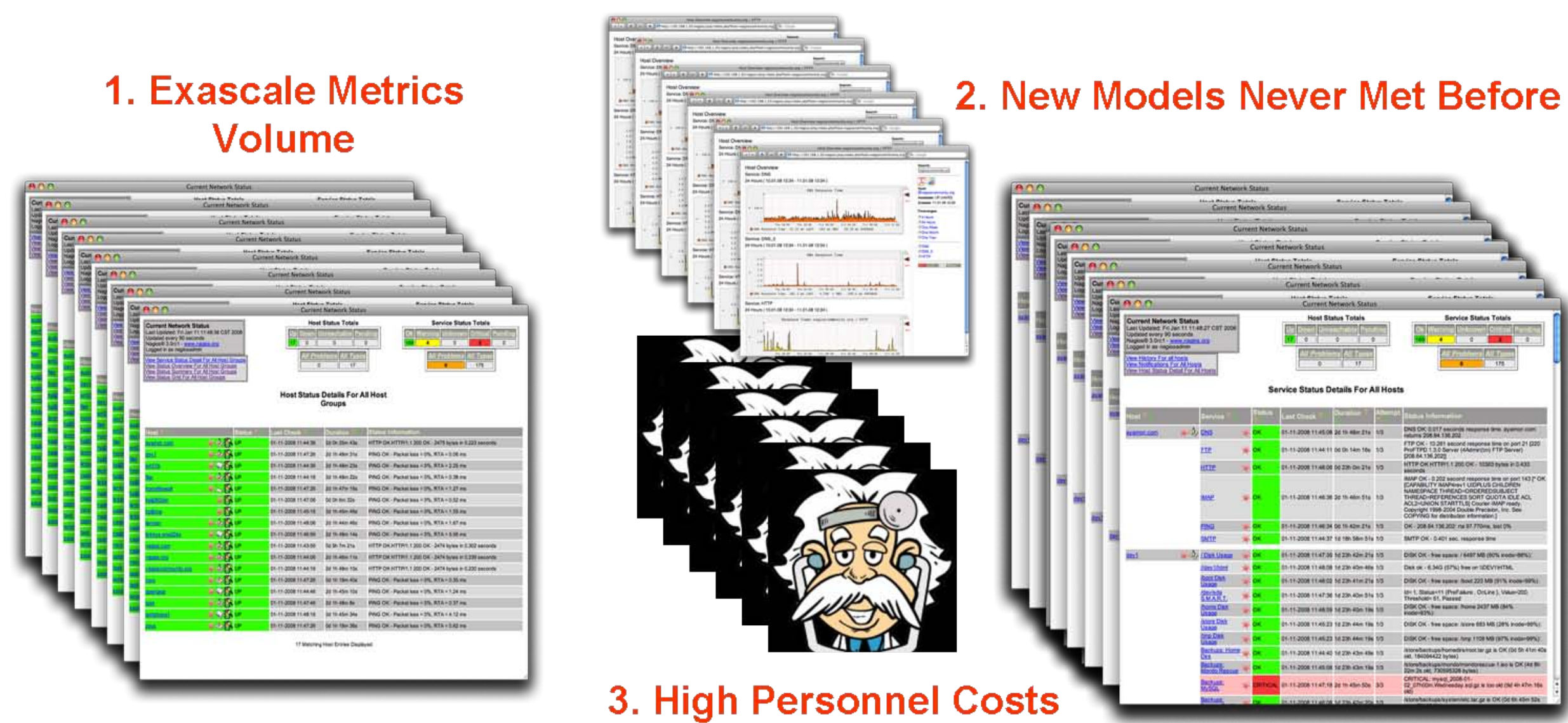# INTEGRATING MONITORING AND ANALYTICS FOR MANAGING LARGE-SCALE DATA CENTERS

Chengwei Wang, Karsten Schwan, Vanish Talwar*, Greg Eisenhauer, Liting Hu, Matthew Wolf
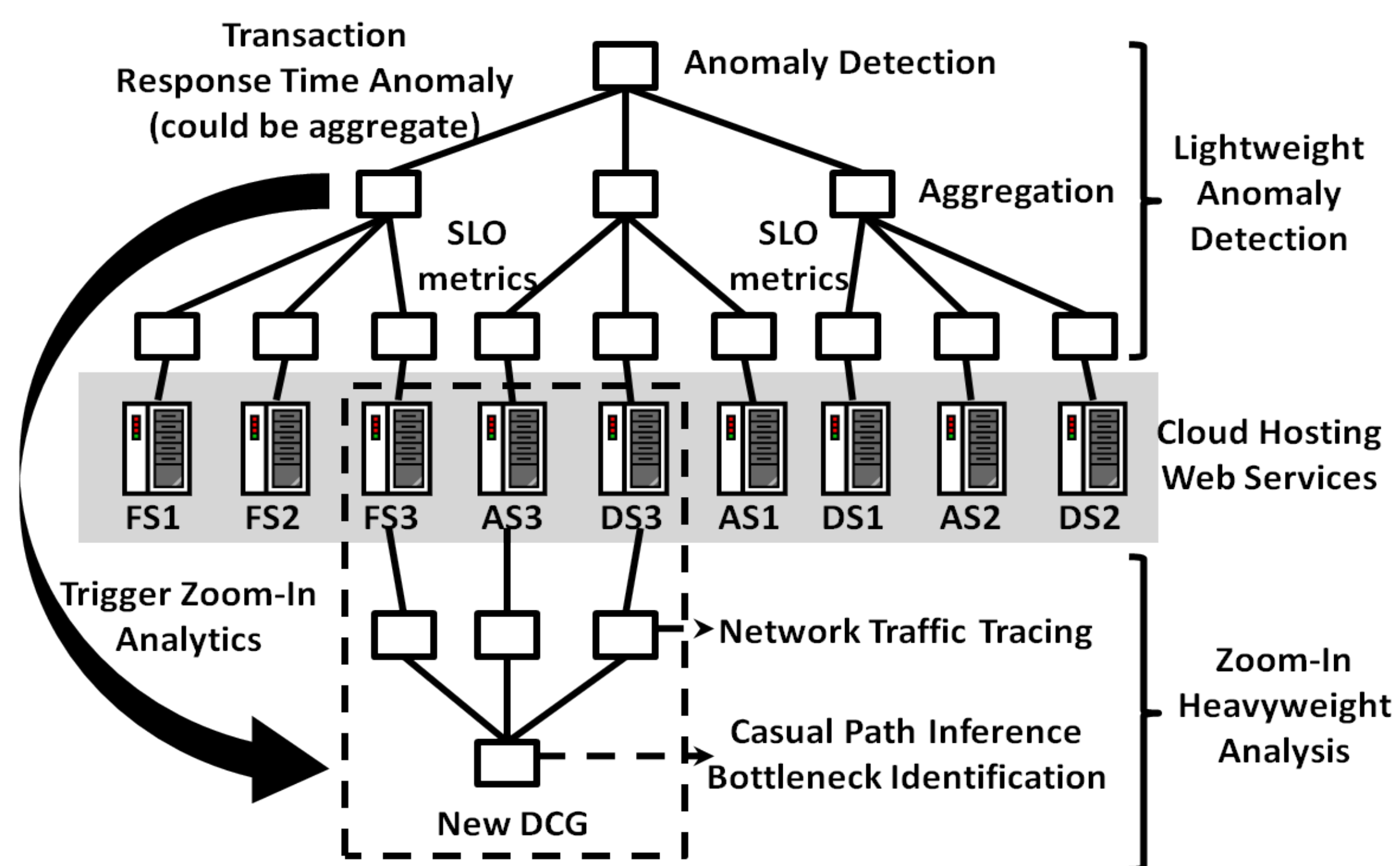CERCS Georgia Tech, *HP Labs

BACKGROUND/INTRODUCTION
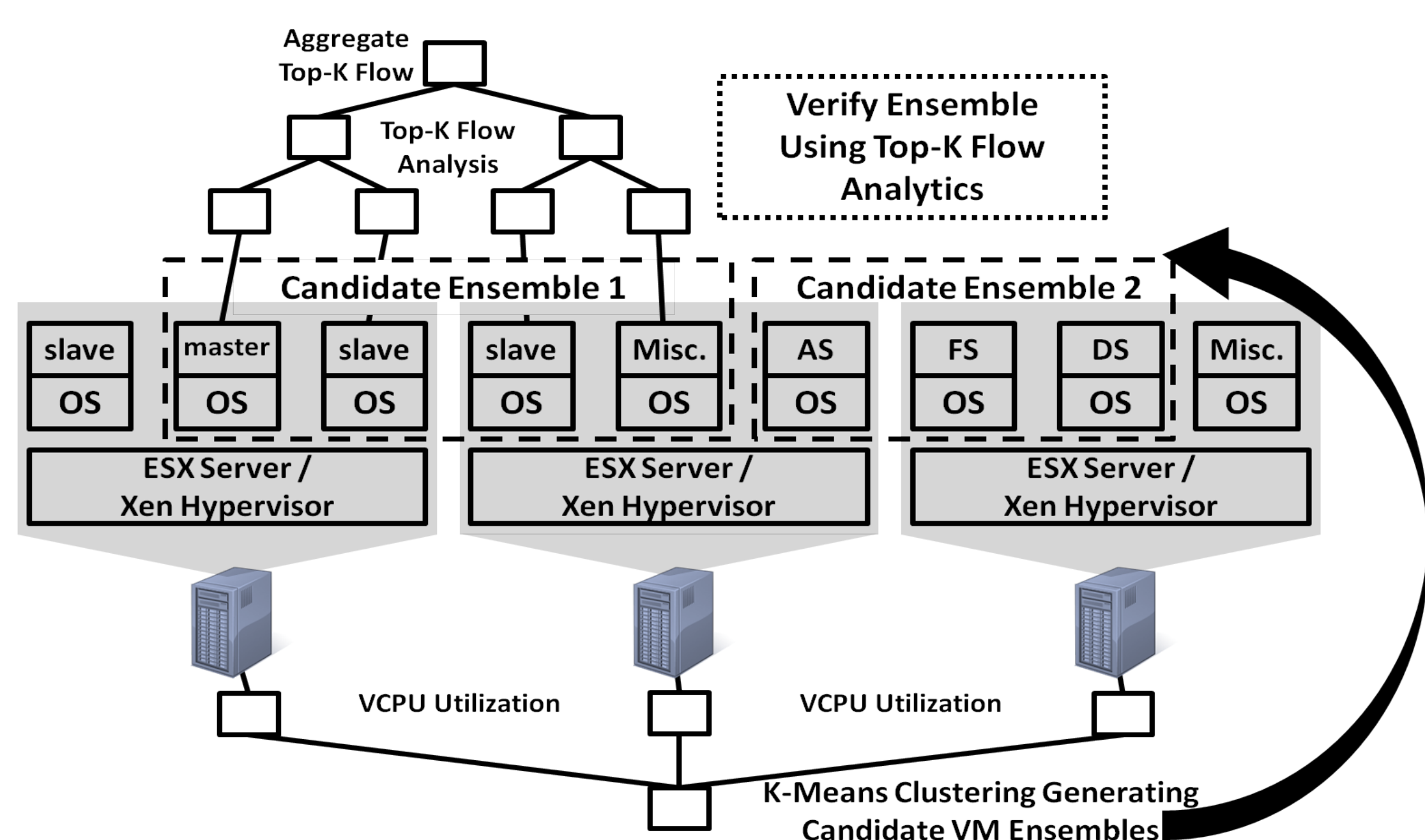
Challenges: Monitoring/Diagnosis in Data Center

1. Exascale Metrics Volume
2. New Models Never Met Before
3. High Personnel Costs

USE CASES

Zoom-In Analysis (ZIA):
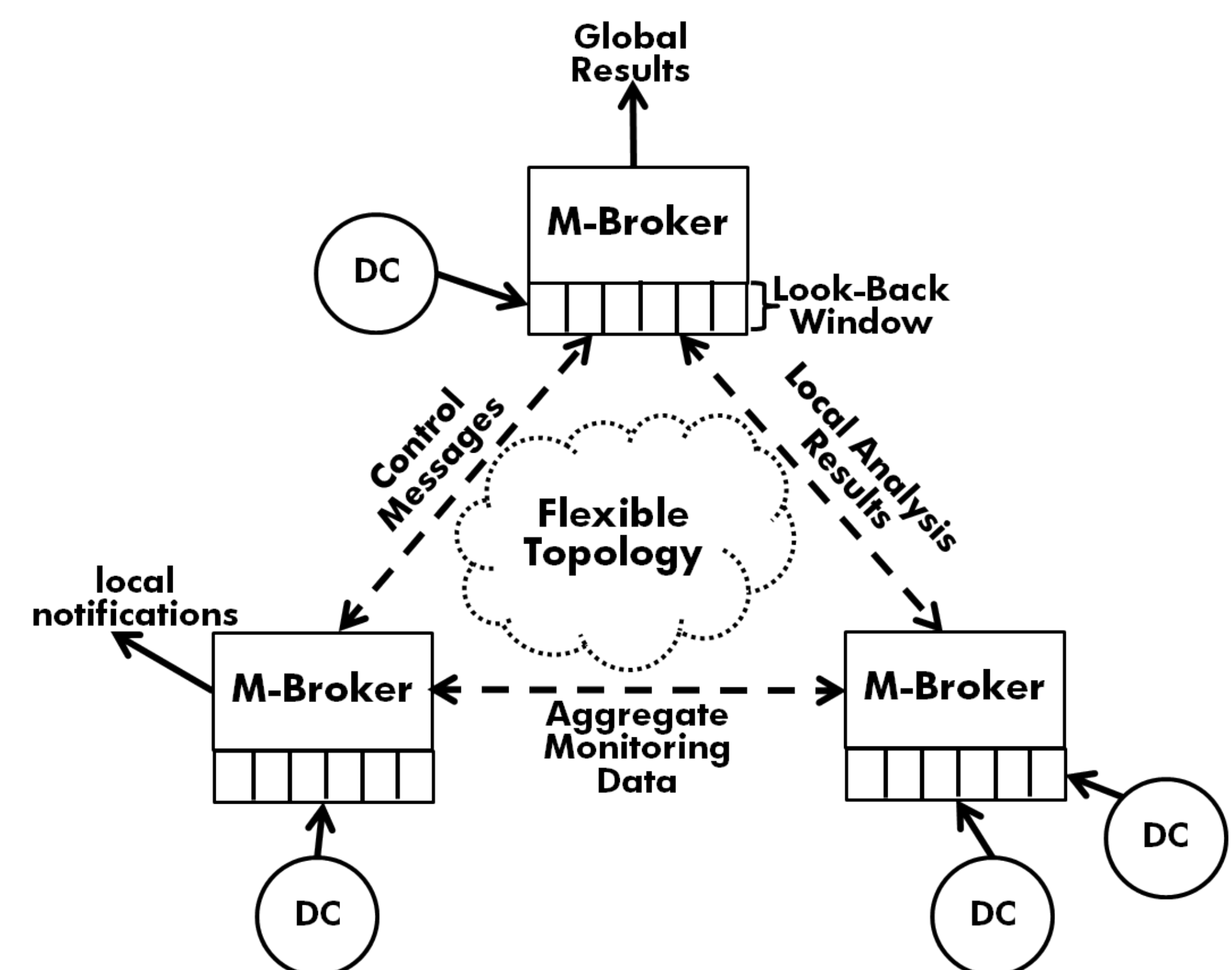

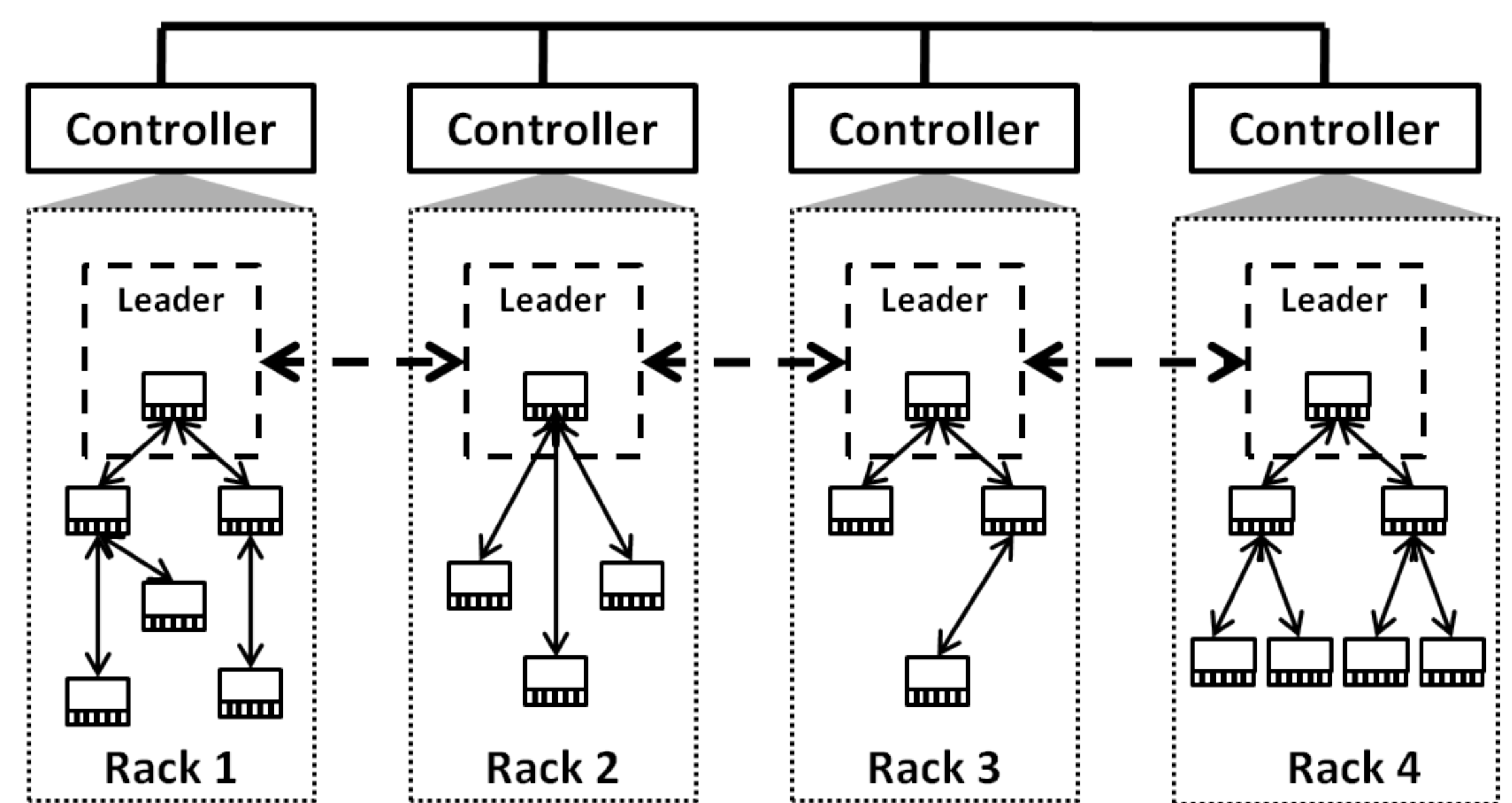### Virtual Machine Clustering:

REFERENCES

- C. Wang, K. Schwan, V. Talwar, G. Eisenhauer, L. Hu, M. Wolf. "A Flexible Architecture Integrating Monitoring and Analytics for Managing Large-Scale Data Centers." In ICAC 2011.

- M. Kutare, G. Eisenhauer, C. Wang, K. Schwan, V. Talwar, M. Wolf. "Monalytics: online monitoring and analytics for managing large scale data centers." In ICAC 2010.

MONALYTICS = MONITORING + ANALYTICS
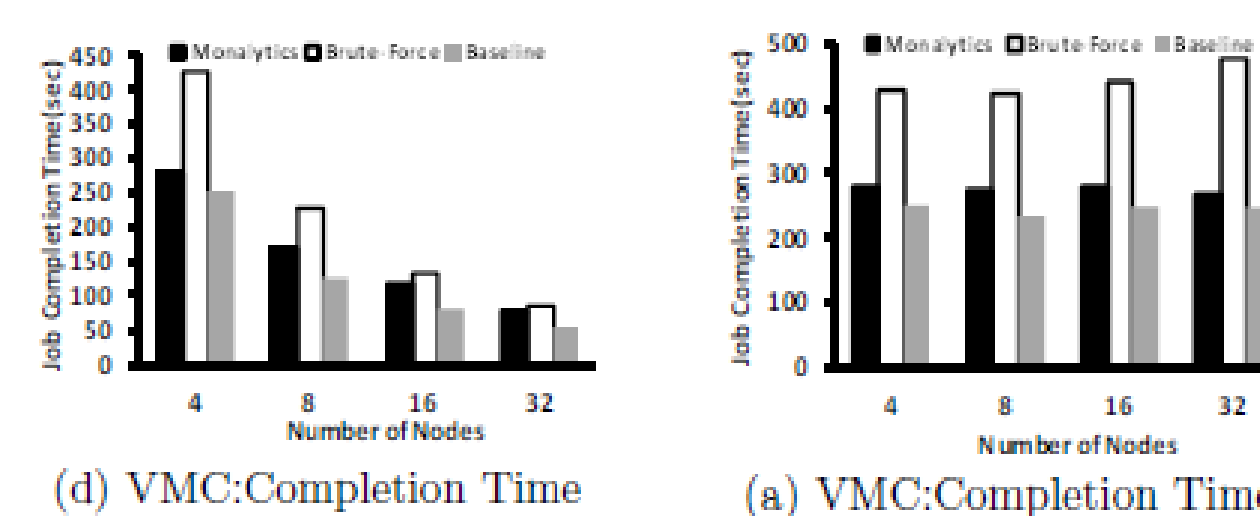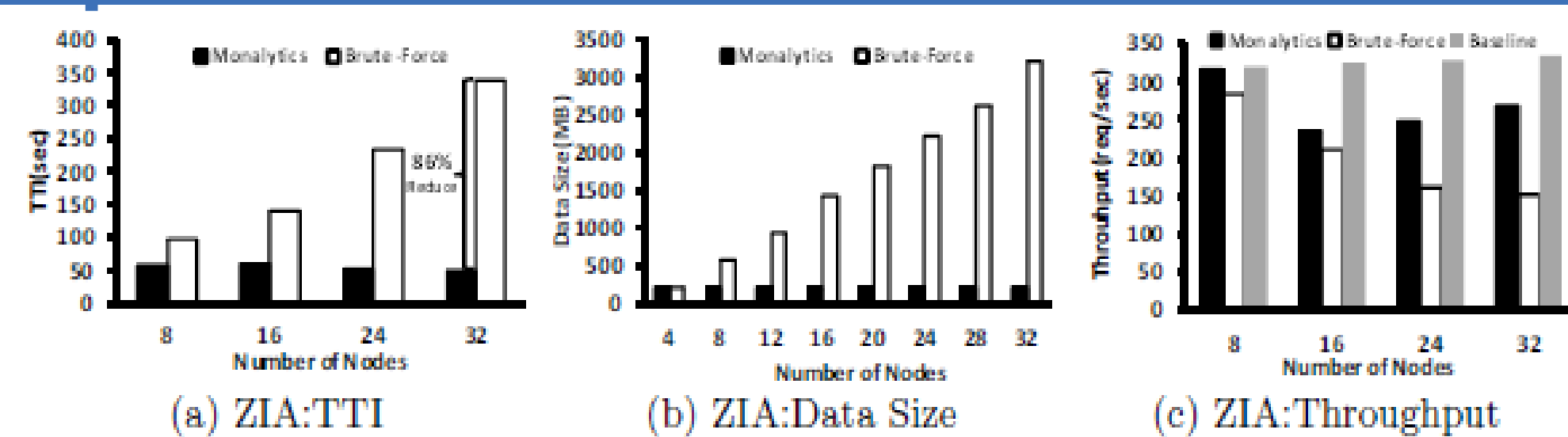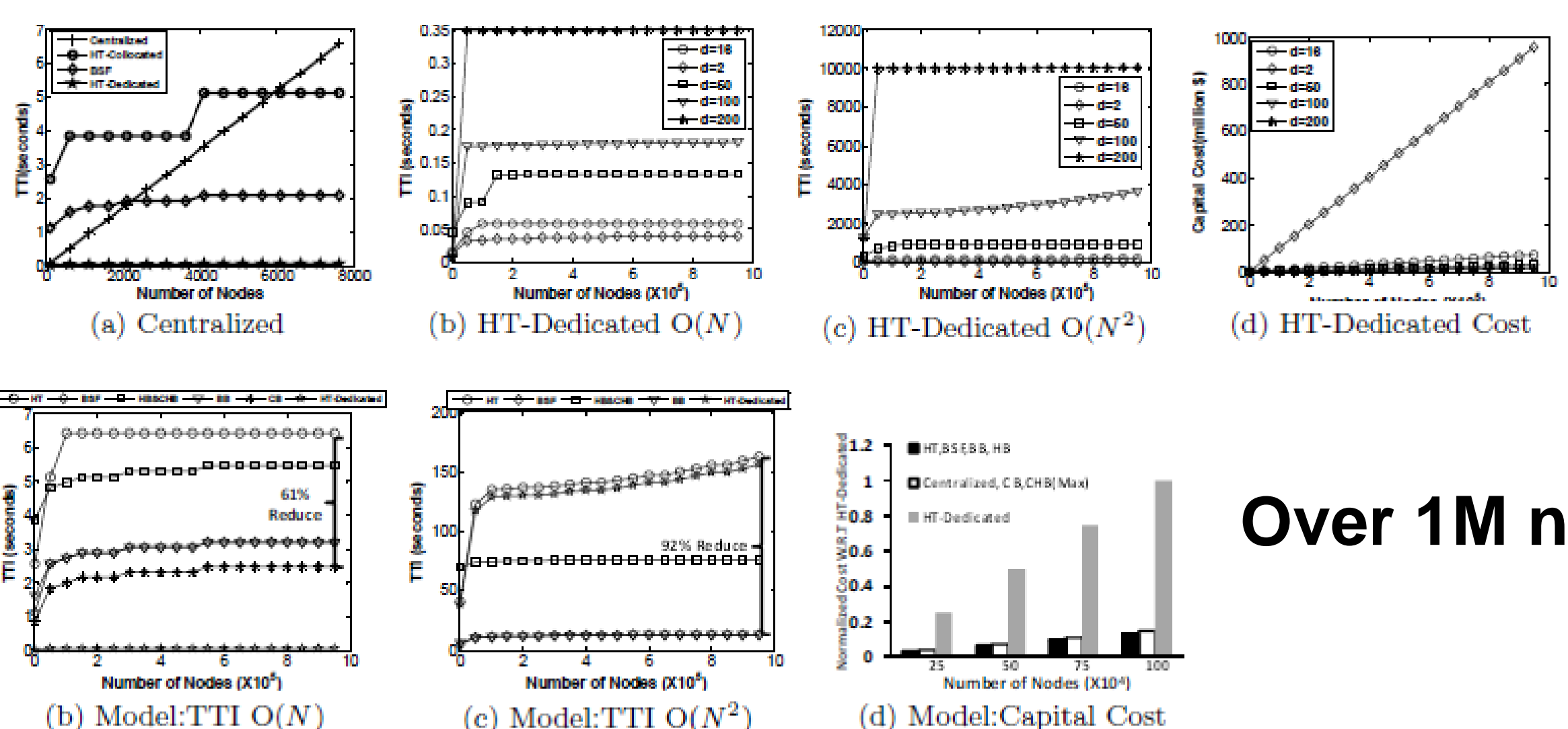
DCG (Distributed Computation Graph):

Hybrid DCG:

EXPERIMENTAL AND ANALYTICAL RESULTS

Experimental results from use cases:

(a) ZIA:TTI (b) ZIA:Data Size (c) ZIA:Throughput

(d) VMC:Completion Time (a) VMC:Completion Time

1. 32 VMs
2. TTI (Time To Insight)

Scalability results from analytical models:

(a) Centralized (b) HT-Dedicated $O(N)$ (c) HT-Dedicated $O(N^2)$ (d) HT-Dedicated Cost

(b) Model:TTI $O(N)$ (c) Model:TTI $O(N^2)$ (d) Model:Capital Cost

Over 1M nodes