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Overview of Autonomous Mobiles Programs (AMPs)

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Autonomous Mobile Programs (AMPs)

AMPs are mobile agents

- aware of their resource needs
- sensitive to the execution environment
- periodically seek a better location

$$Th > Tn + Tcomm$$

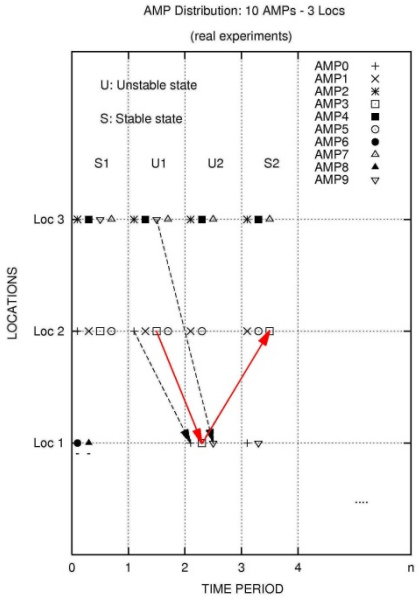
Time here > *Time there* + *Time to transfer*

Been investigated using

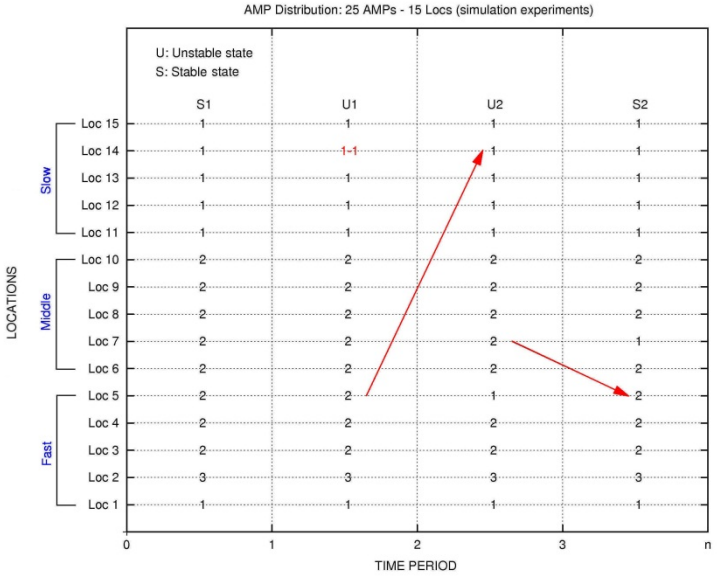
- mobile languages (e.g. *Java Voyager* [Den07])
- simulation [CKT10]
- theoretical analysis [CKT11]

Greedy Effects

- are redundant movements:
  - -- locally optimal choice
  - -- globally suboptimal choice
- occur when AMPs rebalance after a termination or new AMPs start
- are observed in other distributed systems



Location Thrashing



Location Blindness

Negotiating AMPs

cNAMPs are negotiating AMPs with a competitive scheme:

- announce their intentions to move
- compete with each other for permission to transfer

cNAMPs only reduce location thrashing.

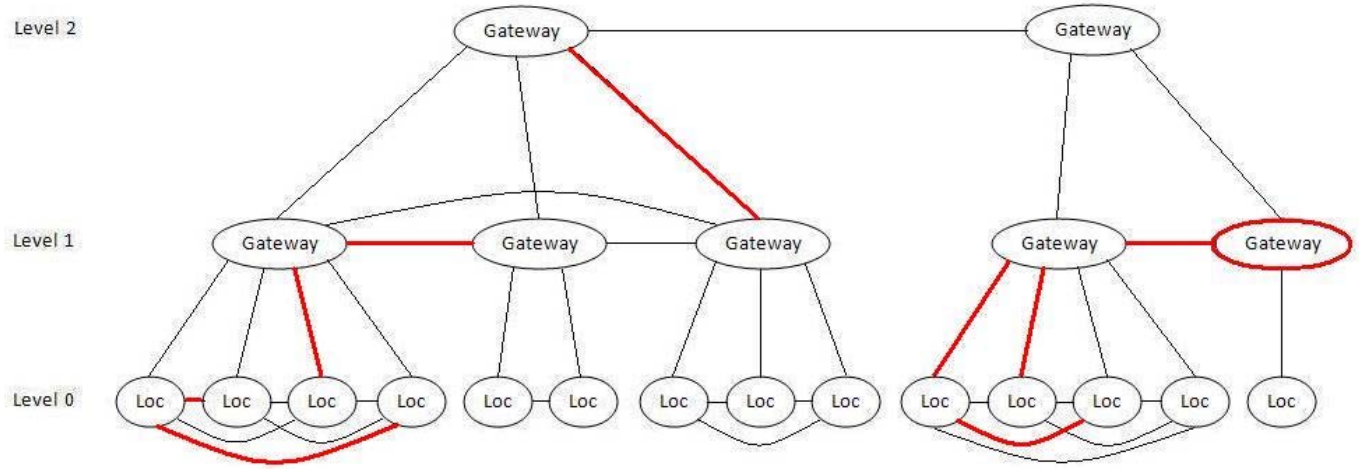
Balanced State Properties -- independent balance, singleton optimality, and consecutive optimality.

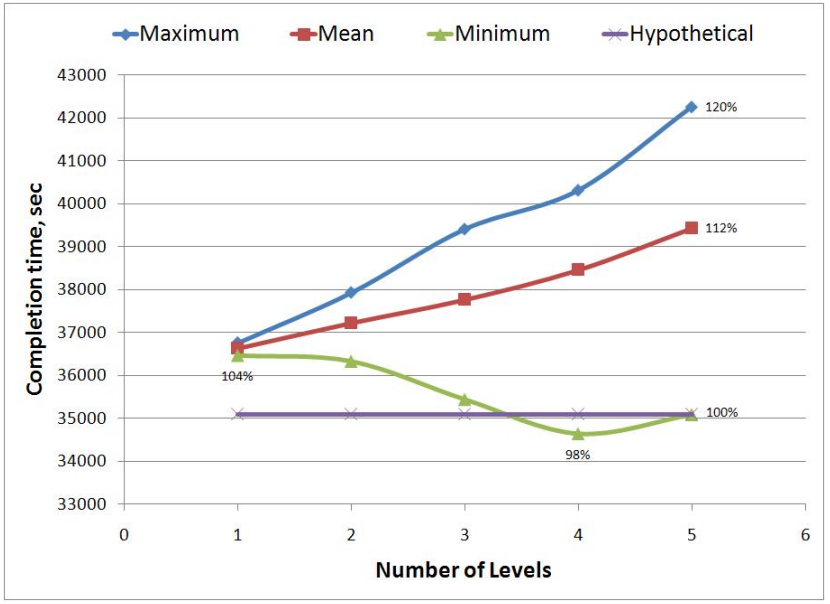
Theorem 1/3: In a heterogeneous network of q subnetworks the number of redundant movements does not exceed $q - 1$

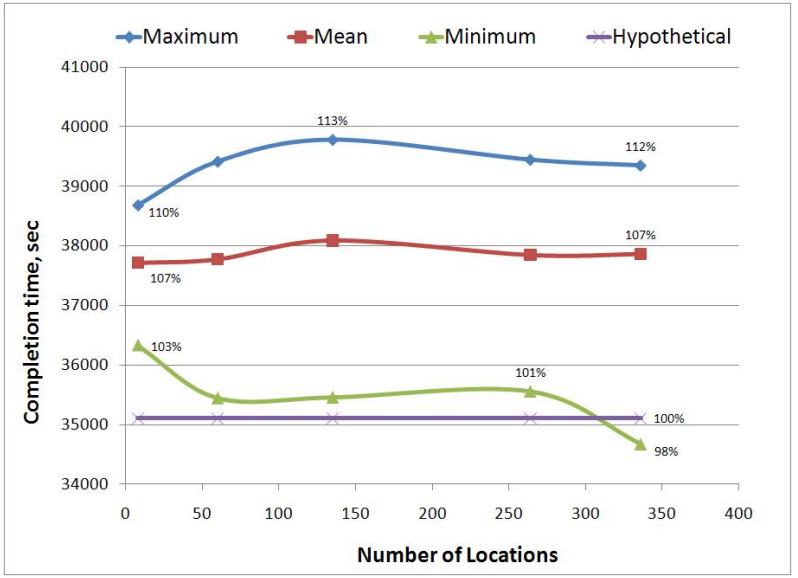
Analysis of Redundant Moveoments:

- a worst case analysis of redundant movements
- the maximum number, and probability of, redundant movements

cNAMPs in Multilevel Networks







Conclusion

- Identified two types of AMP greedy effects
- Investigated extent of AMP greedy effect using simulation
- Introduced the concept of negotiating AMPs (NAMPs)
- Reduced greedy effect (cNAMPs)
- Established balanced state properties
- Designed and evaluated the architecture of multilevel networks

Future Work

- Investigation of Negotiating AMPs alternatives and multilevel cNAMPs
- Implementation of cNAMPs on WANs
- …