SDP IMPLEMENTATION IN MANETs USING OPNET 17.5

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Agenda

1. Introduction to MANETs
2. Related Work and Problem Description
3. Simulation results and analysis
4. Challenges faced
5. Future Work and Conclusion

Introduction to MANETs

Mobile Ad-hoc Networks

- Infrastructure-less Networks
- Mobile nodes
- Fast deployment
- Rapidly Changing
- Network Partitions
- Shared medium
- Scalable and Flexible

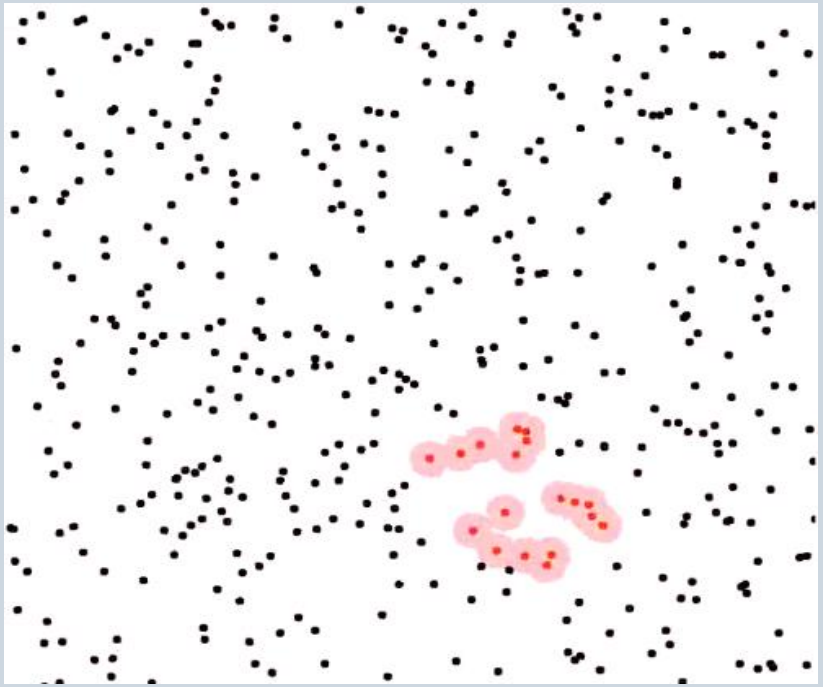


Fig 1: Black dots Represents nodes in MANETs

Introduction to MANETs

Mobile Ad-hoc Networks Applications

- Military
- Collaborative Work in new environment.
- Emergency Operations
- Mining Operations

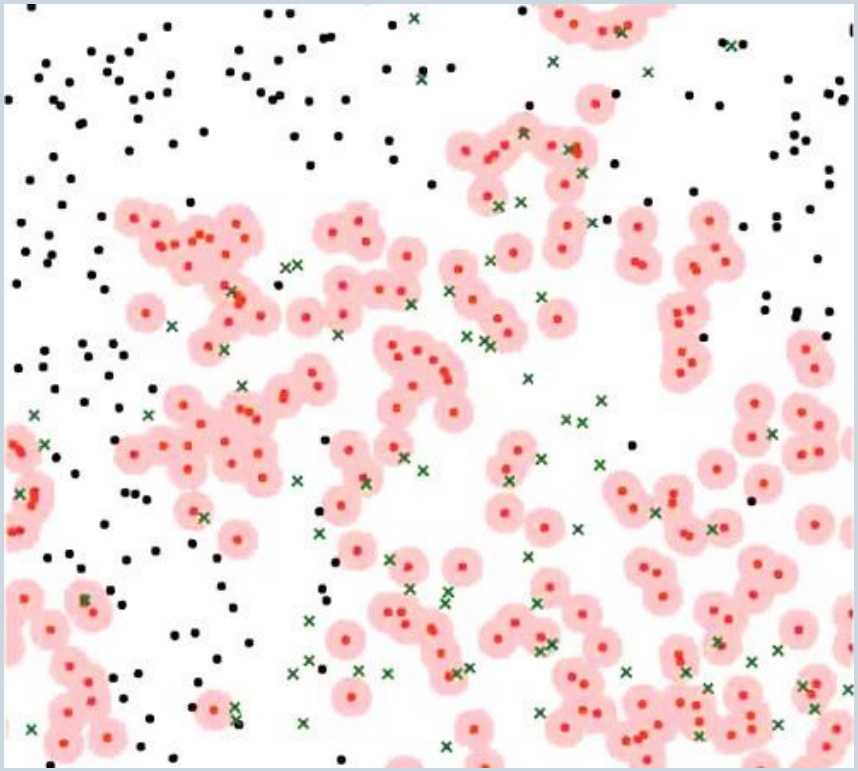


Fig 2: Pink dots Represents nodes in replication

Introduction to MANETs

SDP-Service Distribution Protocol

- Interest-based service replication.
- Replication
- Hibernation
- Restoration
- Similar Example is SIR Algorithm for Service Distribution

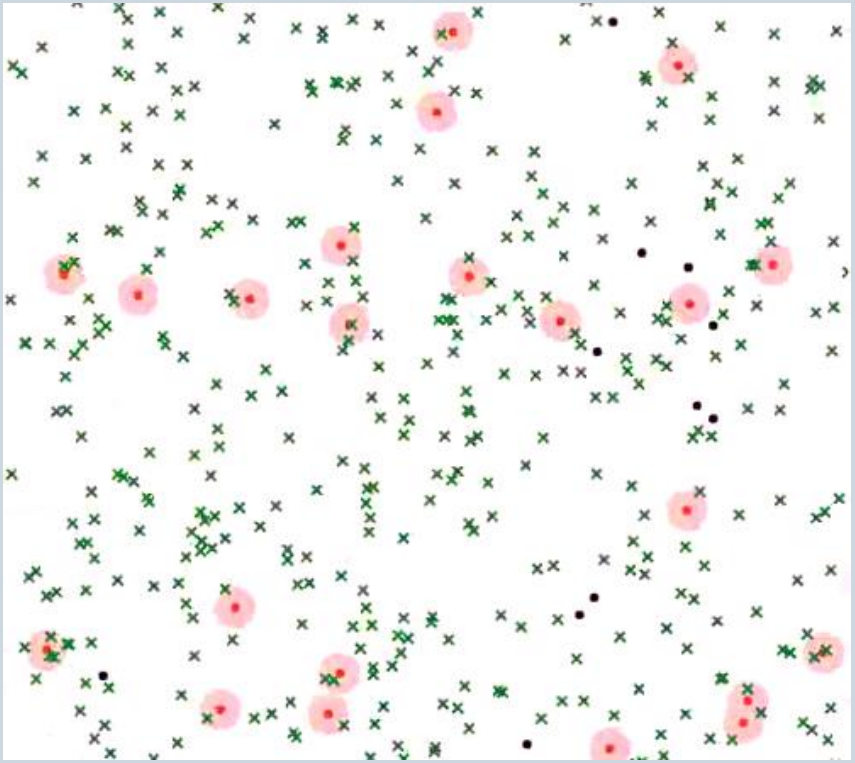


Fig 3: Green Cross Represents nodes in Restoration

Related Work

- Tested using a limited number of models
- Network models arranged as star, ring or lane topology.
- Multiple Simulation runs Require about a day to Execute

Problem Description

- Network consists of
  - Mobile Nodes
  - Mobility Configurator
  - Repository
- Random Placement of Nodes
- Multiple seed values

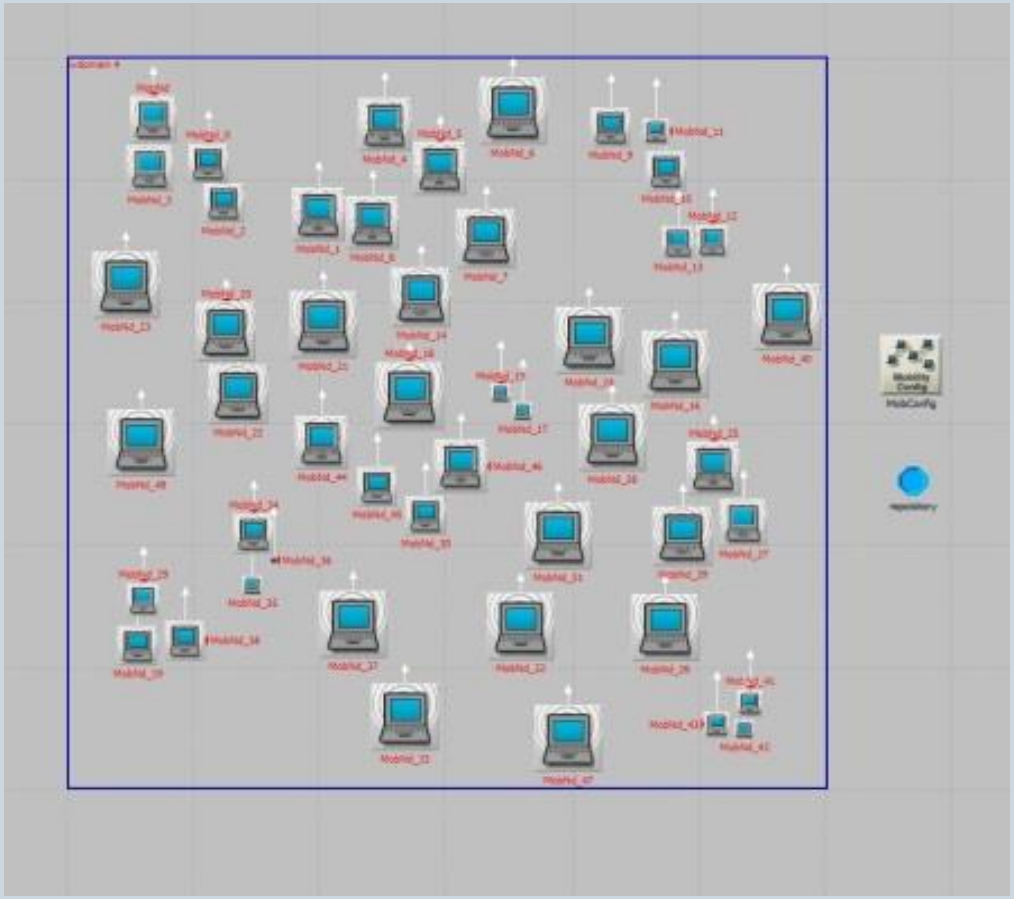
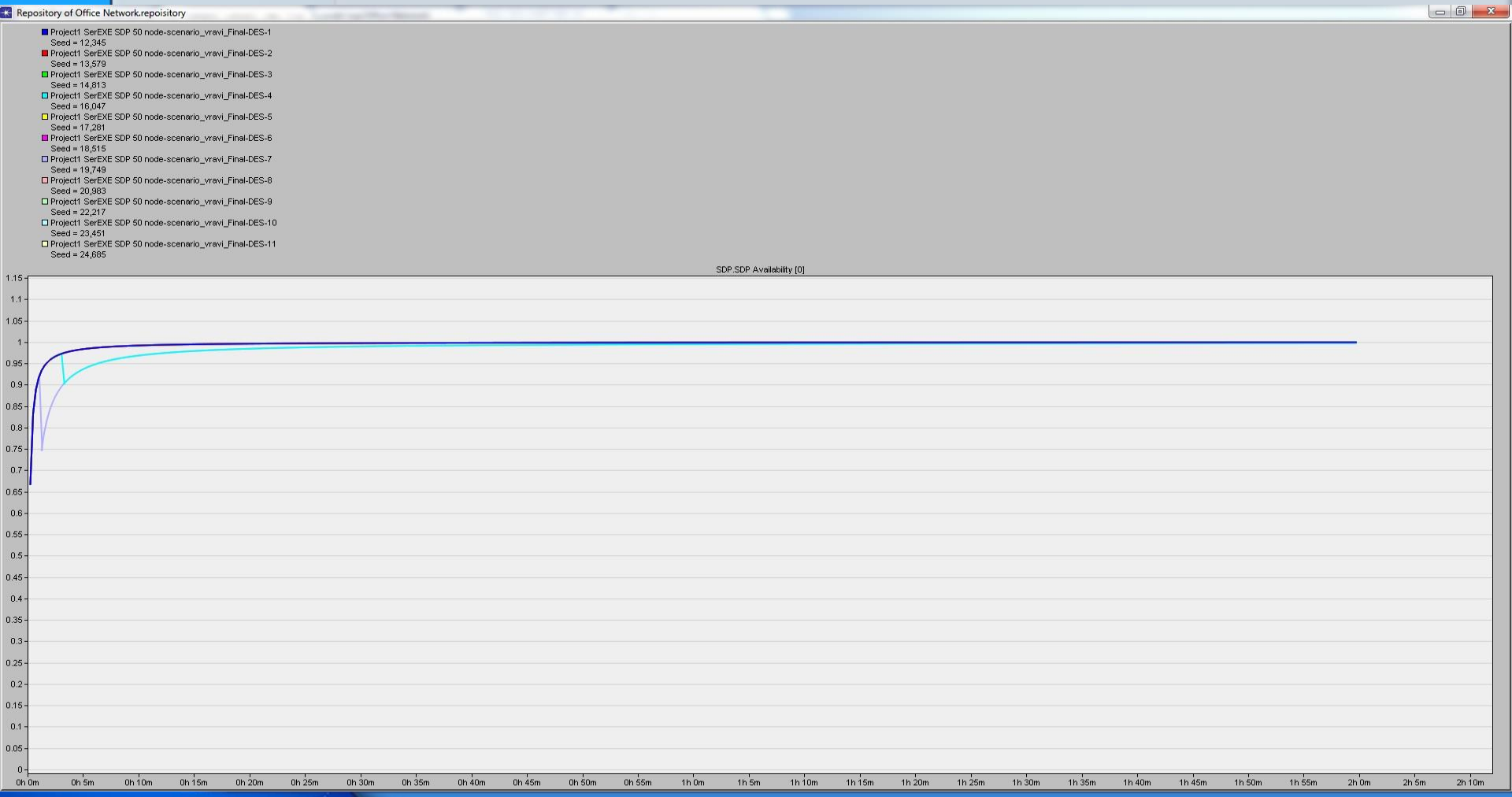


Fig 4: Model developed using OPNET

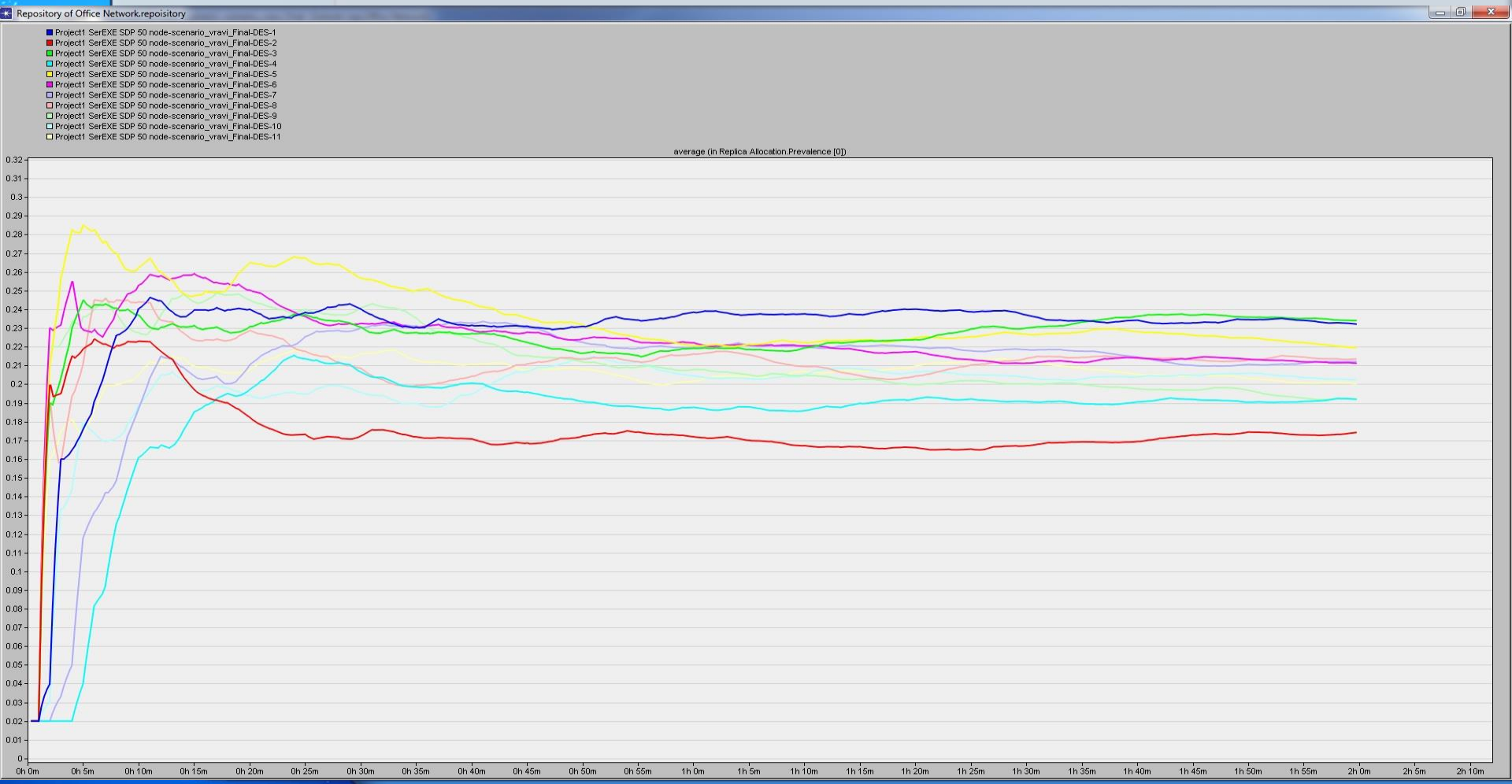
Simulation Results

SDP Availability vs Simulation Time



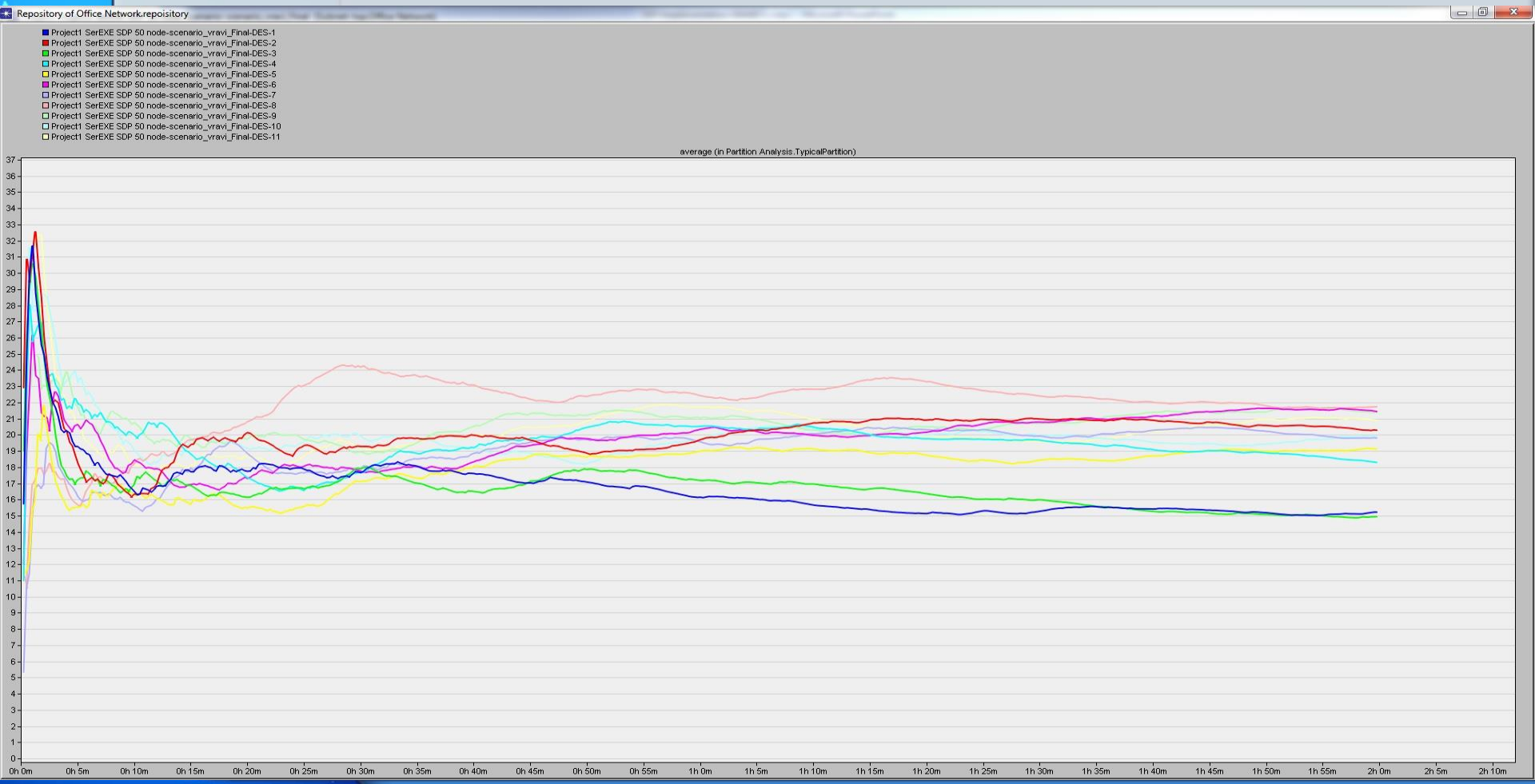
Simulation Results

Allocation Prevalence vs Simulation Time



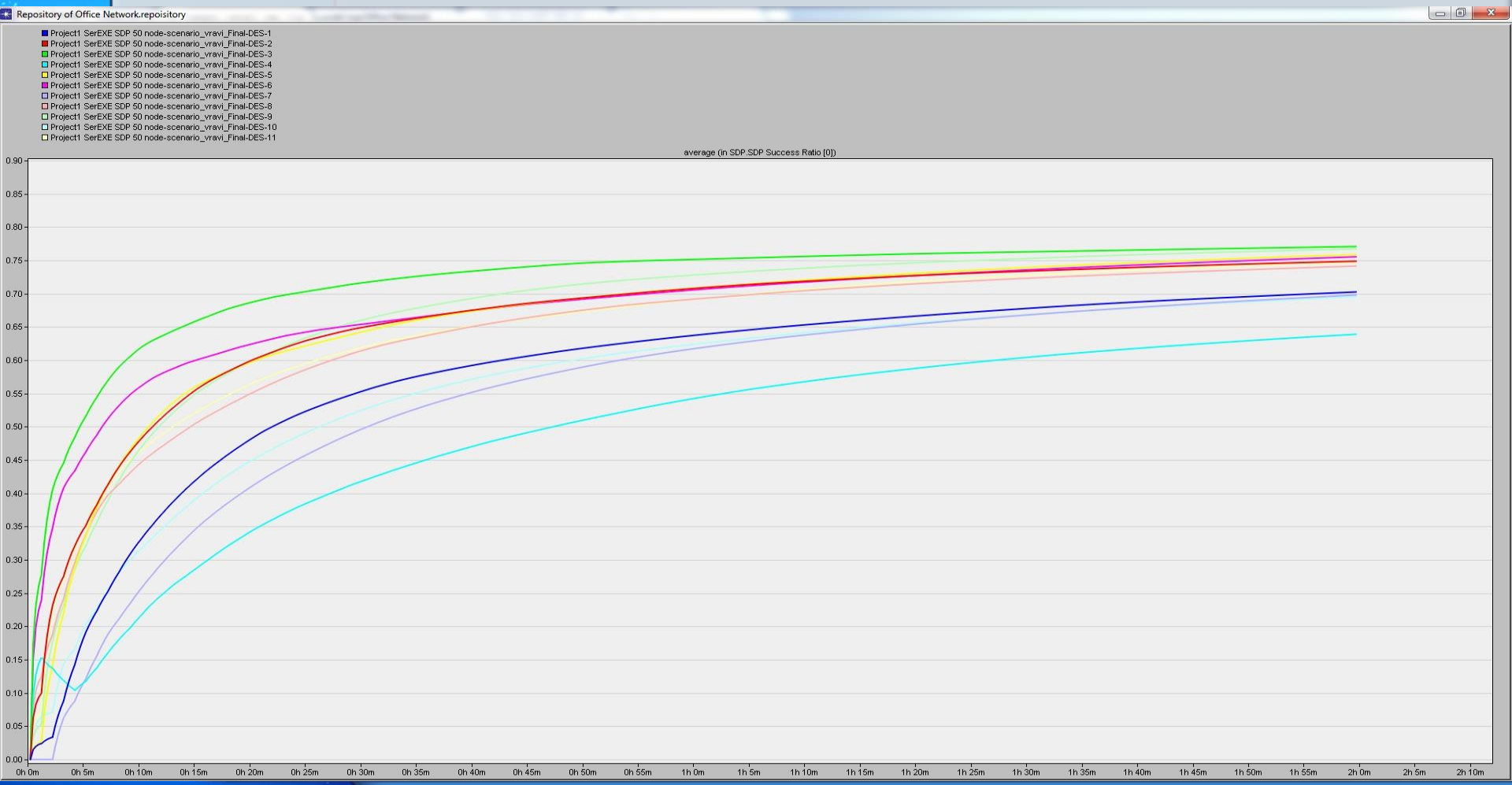
Simulation Results

Partition vs Simulation Time



Simulation Results

SDP Success Ratio vs Simulation Time



Analysis of Results

STATISTIC	VALUES	COMMENTS
Availability	= 1	Indicates that the service was available from start to end.
Prevalence	> 0.17 &< 0.28	Number of nodes with active replicas / Total Number of network participants At any time 3 to 5 nodes had active replicas when total participants were 20.
Partitions	Around 15 to 20	The number of active partitions at any given time
Success Ratio	Slowly reaches to 1	Shows that the longer the service lasts the more successful the Network.

Challenges Faced

- Complete Models were not available on the Contributed Model website.
- Setting up the Environment Variables
- Compilation of the ‘c++’ commands from the command prompt
- Configuring OPNET to run and execute
  - Visual ‘c++’ in Windows
  - GCC Compiler in Linux.

Conclusion

Conclusion and Future Work

- Achieved the Expected Output results.
- Made an interest based and Topology independent Comparison.
- Shows the success of SDP in a truly Mobile Environment.
- Future Work
  - To Optimize Code efficiently.
  - Alternative approaches towards better results.

References

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[2] Mohamed Hamdy and Birgitta König-Ries, "Service Availability, Success Ratio, Prevalence, Replica Allocation Correctness, Replication Degree, and Effects of Different Replication/Hibernation Behavior Effects of the Service Distribution Protocol for Mobile Ad Hoc Networks -A Detailed Study-," JENAER SCHRIFTEN ZUR MATHEMATIK UND INFORMATIK, Technical Report: Math/Inf/08/08, Friedrich-Schiller-University Jena, December 2008.

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[6] Zheng Lu, University of Essex and Hongji Yang, De Montfort University, Leicester, “ Unlocking the power of OPNET Modeler”, Cambridge, Feb 2012.

Questions ?