

Ensuring Non-Opacity in Discrete Event Systems



Introduction

We use finite automata from theoretical computing to model discrete-event systems. Automata are 5-tuples that can be used to represent how processes moves from state to state upon the occurrence of events. A sequence of events in the DES is called a string and is comparable to a path in a graph. We assume that not all events in a string are observable to an agent. We model an agent's observations with a mapping θ and then for a given string s generated by the system, $\theta(s)$ would be the sequence of events that the agent observes. Recently, researchers have been examining opacity, the ability of a system to prevent some set of strings (called secrets) from being distinguished from some other set of strings (non-secrets). When a system is opaque then secrets cannot be distinguished from non-secrets. In this project, we are interested in decentralized agents, each of whom has a potentially different observation mapping and we wish to determine a strategy for communicating event occurrences among the agents so that to some agent the system is non-opaque. The difficulty of the problem arises when one wants to find a minimal set of communications because what each agent observes (both directly and from communications sent to it) impacts what it can communicate to other agents.

Definition (Opacity)

Results

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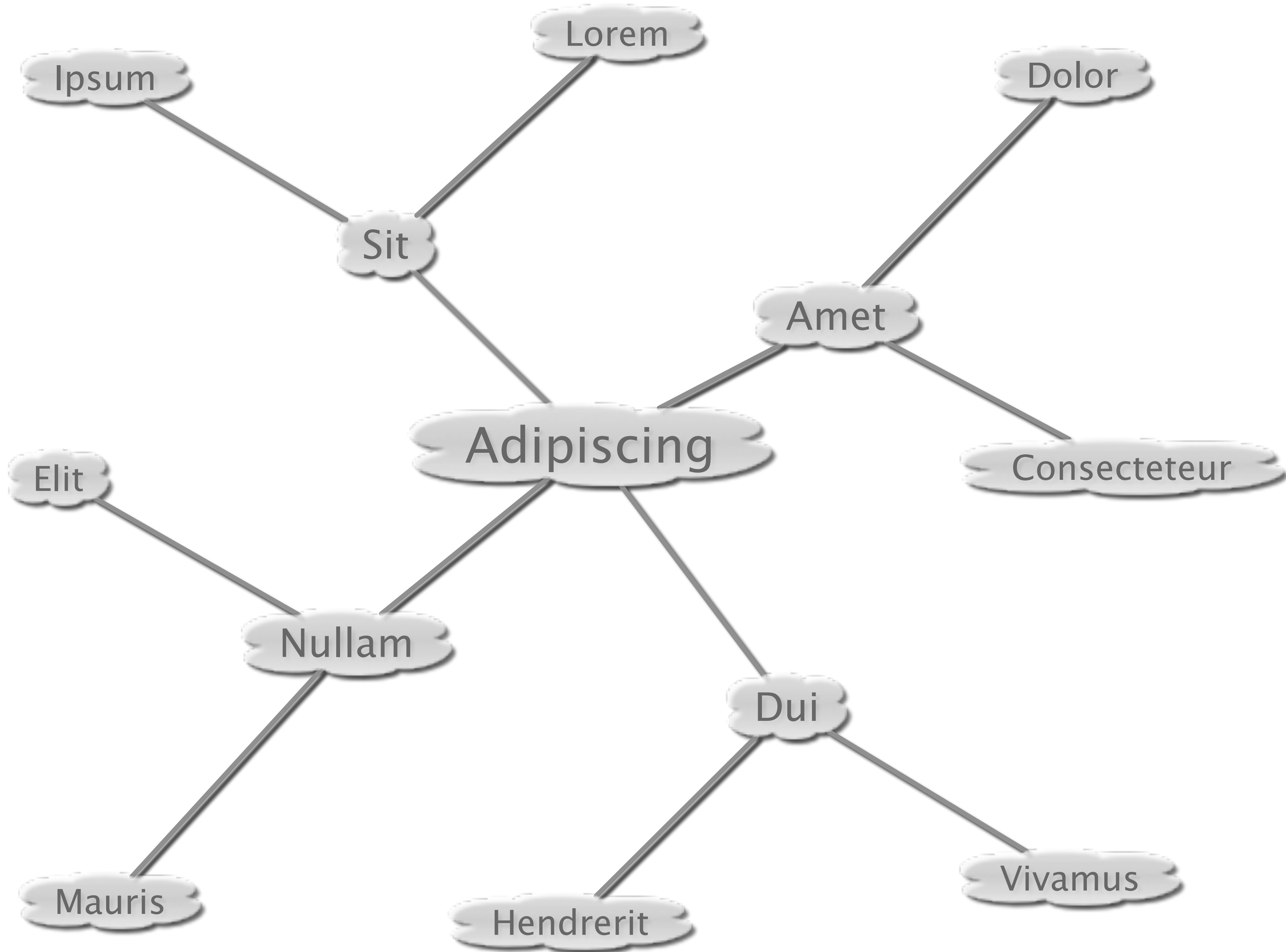
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Acknowledgments

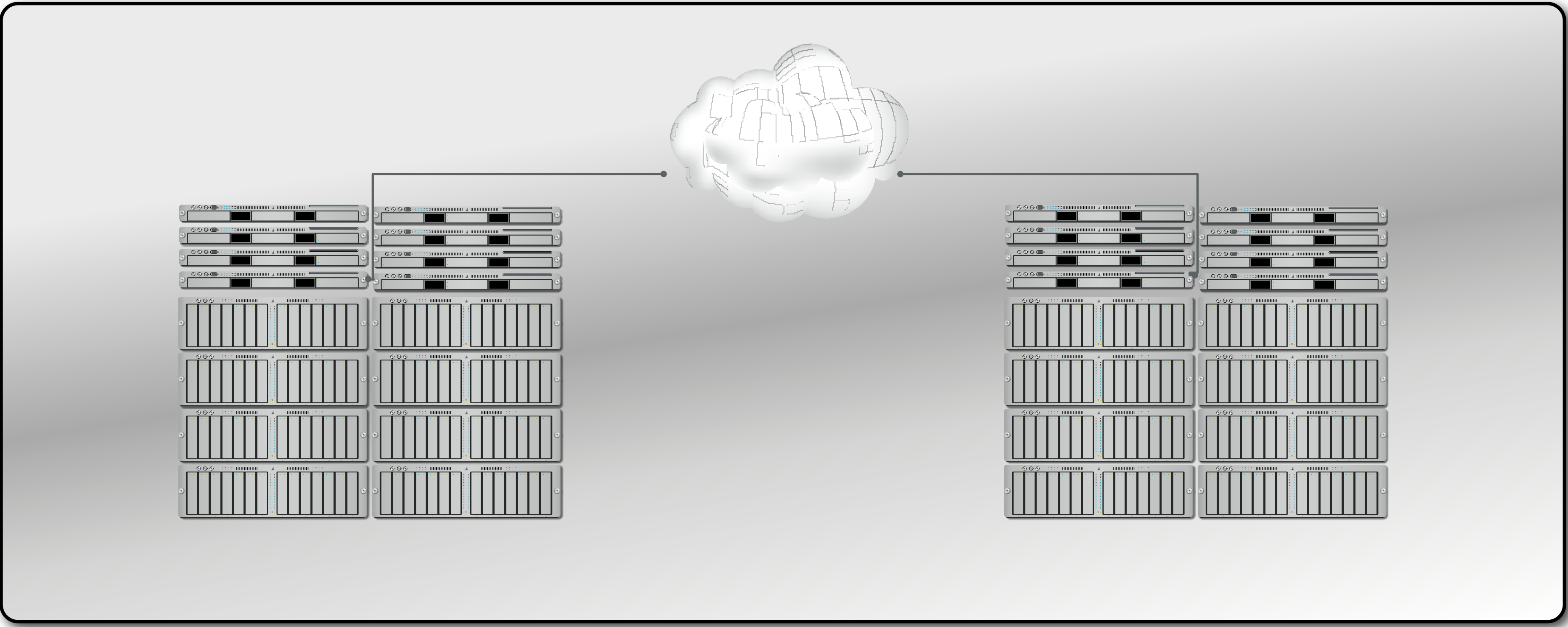
Thanks to our sponsor, Giganto Corp, for technical and equipment support. Thanks also to the Clinic staff, who made this project possible.



Conclusions

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References

Karen’s description of the project on fields website

1922. Editors. “Egestas purus in blandit.” *Journal of Ancient Research*. **32**:173, pp. 25–43.

2014. Jones IV, Robert. “Perspectives on *Ancient Research*.” Ph.D. Thesis, Well Past University.

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More Information

Report available from <http://www.math.hmc.edu/clinic/secret/giganto/2014-giganto-clinic-report.pdf>.

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