Request Optimization and Simulation Proposal

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The Virginia State Corporation Commission's (SCC) Automated Systems (AS) section has expanded duties such as deploying a web content management system, fulfilling an increasing number of website and technical requests for the past few months. With Covid-19 sending us home to work, there is an opportunity to improve workload distribution now, more than ever. In *Service-Delivery Modeling and Optimization* by Yixin Diao, a global information technology service provider developed an analytics model that uses components of their staffing decision-making process to develop a scalable prescriptive solution. They developed an optimization and simulation framework that utilizes the relationships among workload type/volume, contractual constraints, agent skills, and shift schedules to generate optimal staffing levels and the best mix of skills in each Service desk team to optimize service-delivery performance. The "solution has been deployed globally at more than 640 service delivery units and has yielded more than $52 million in cost savings and cost avoidance to date." (Diao et al. *Service-Delivery Modeling and Optimization*)

I propose we use a similar optimization and simulation framework to optimize request distribution and simulate future request volume. AS is currently assigning a team member every fourth week to be responsible for handling requests submitted via email to the AS email box. This workload assignment approach produces a high-volume backlog for some team members while other team members are underutilized. Simulation and optimization can model relationships between AS team member's workloads, request types, skill level, and backlog levels to create optimal distribution of service requests between team members. This is an opportunity to analyze historical data to identify and simulate temporal patterns in workload

categories and volume. The results of the data collected will then be used to recognize the impact of changes in the request environment over time.

Daio used a commercial discrete-event simulation model (DESM) to accurately capture and solve their staffing service-delivery group problems. A team of modelers collected and categorized, data for six months such as workload, work activity and demographic data utilizing data templates, a data portal and timing tool, a data preprocessor and a modeling and optimization engine to make the process scalable. AS would start with a MS Excel template, use JupyterLab to read a python (optimization and simulation) model and use Simio or Arena (python solver package) to generate a solution, free of cost. I am estimating AS will need two months and four analysts to develop an algebraic test model and 6 months to collect scalable data and develop the python model. After the initial model is developed, additional evaluation will be needed for possible extra constraints. Since there were limited tracking methods (Outlook tasks) set in place, we will use the categorized data collected in Excel to compare to previous tracking methods to gain insights on individual performance as well as performance of the AS team. Additionally, visualizations could be created for management, using our current version of MS Power BI.

To conclude, AS would greatly benefit in not only workload distribution but also visualizations for management, service request statistics by team member and the potential to predict the request volume over time. The idea is to start with a simple model that can optimize BOI Automated System's requests and then possibly introduce and adapt the model to the Information Technology Division's Helpdesk team, allowing for all divisions to benefit from this model. For more information, please see the article (Diao et al. *Service-Delivery Modeling and Optimization*) below. Should you want to discuss further, please let me know.

Bibliography

Diao, Yixin, et al. “Service-Delivery Modeling and Optimization.” *Interfaces*, vol. 45, no. 3, 2015, pp. 243–259., doi:10.1287/inte.2014.0783.