Process Simulation

Process simulation is a technique used to create a virtual model of a business process, allowing for detailed analysis and optimization. By simulating a process, organizations can visualize how different components interact, identify potential bottlenecks, and test various scenarios without disrupting actual operations. Understanding and optimizing processes through simulation is crucial for improving efficiency, reducing costs, and enhancing overall performance. Process simulation provides a structured approach to achieving these goals, ensuring that processes are not only well-understood but also continuously improved.

Process Simulation Methodology

Effective simulation includes the following elements:

1. **Start with a Process Model:** Begin by developing a detailed process model of the as-is process. This model serves as a blueprint, outlining each step of the process and the interactions between different components.

2. **Gather Information:** Collect as much relevant data as possible about the process. This includes historical data, performance metrics, and any other information that can provide insights into how the process operates. The more comprehensive the data, the more accurate the simulation will be. Involving the process owners at this step is vital. Their feedback, insight, and information is pivotal. They know the process and know what does and does not work. Suggestions for meaningful improvements often come from the process owners.

3. **Create a Flow of Events:** Map out the sequence of events that occur within the process. The process map developed earlier can serve as the foundation for this. The simulation needs to include key activities, decision points, and the flow of information or materials. This step helps in understanding the dynamics of the process and how different elements interact.

4. **Add Quantifiable Metrics:** Incorporate measurable metrics: time, cost, resource utilization, and output quality. Quantifying these aspects allows for a more detailed analysis and helps in identifying areas for improvement.

5. **Test for Accuracy:** Validate the simulation model by comparing its output with real-world data. This step ensures that the model accurately represents the actual process. Any discrepancies should be analyzed, and the simulation adjusted accordingly.

6. **Experiment with the Simulation:** Use the simulation to test various scenarios and "what-if" analyses. This is a good place to test all ideas that were discussed with the process owners, as well as ideas from an efficiency team. This experimentation can reveal potential bottlenecks, inefficiencies, and opportunities for optimization. By simulating different conditions, you can predict the impact of changes before implementing them in the real world.

7. **Document and Report:** Thoroughly document the simulation process, including the model, data sources, assumptions, and results. Prepare a detailed report that summarizes the findings and provides recommendations based on the simulation outcomes. Clear documentation is crucial for transparency and future reference. It is a good idea to have as-is and to-be versions of the simulation to help compare results.

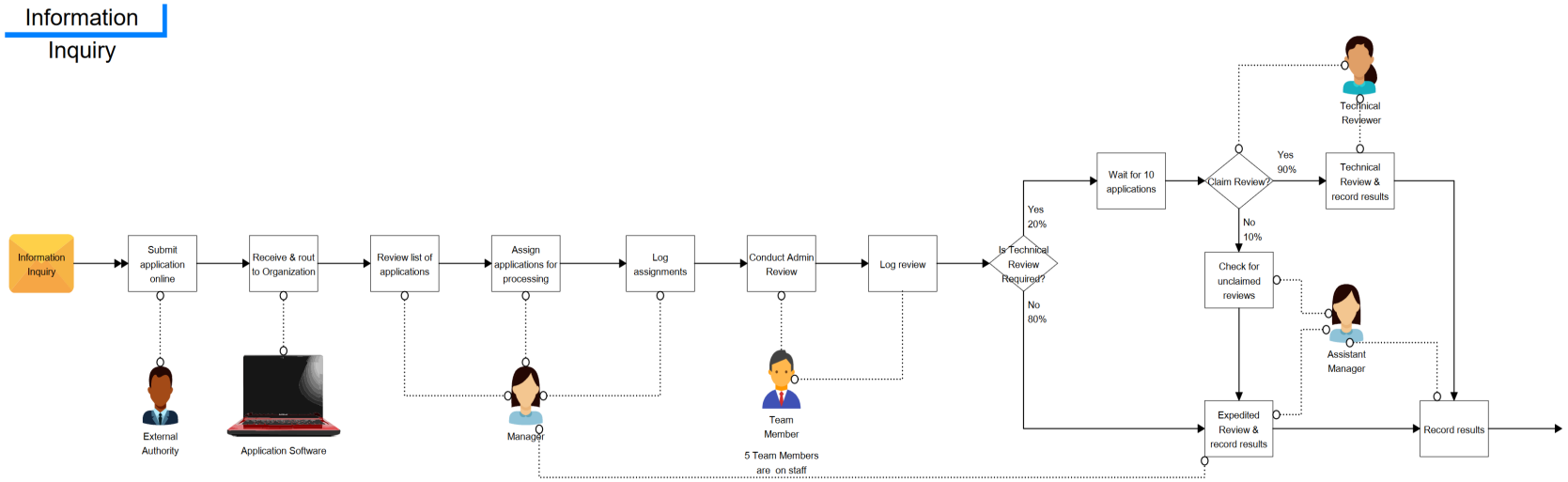
8. **Receive Feedback:** Share the simulation results and report with stakeholders to gather feedback. This feedback is valuable for refining the model and ensuring that the simulation aligns with business objectives. Engaging stakeholders in the process fosters collaboration and buy-in for any proposed changes.

Case Study

Alpha Beta Gamma is an organization that provides information to qualified parties. These qualified parties must apply to receive the information provided by Alpha Beta Gamma. Alpha Beta Gamma starts the process by receiving an application and conducting a brief administrative review. The application then goes through either a technical review or an expedited review for approval. However, lengthy processing times have resulted in long application queues, backing up the process and impacting staff allocation. Changes need to be made. To identify potential improvements without disrupting the current process, Alpha Beta Gamma will gather data and to create a simulation of the existing review process. By simulating various changes/scenarios, Alpha Beta Gamma can evaluate the potential impact of possible improvements on processing times and overall efficiency.

Modeling the As-Is Process

First, meetings were held to gather information about the current process. As-Is process models were created and shown to the process owners to verify that the information was interpreted correctly. Once verified, a simulation of the As-Is process (shown below) was developed for further analysis.



As-Is Process

After development, a simulation was performed, emulating a six-month period. The simulation was performed 6 times before calculating the average of the results (shown below). During a six-month period, 596 applications can be processed, with each application taking an average of approximately 3 business days and costing $247 worth of labor to complete. Of those 3 business days only 4 hours of processing is actually conducted; the rest of the time the application is waiting in the processing queue.

Qty Processed	Average Cycle Time Min	Average VA Time Min	Average NVA Min	Average Touch Time Cost
595.83	1,546.03	248.37	1,297.66	247.04

The To-Be Streamlined Process

With the simulation developed and results analyzed, the following opportunities for improvement were identified as a result of running the simulation:

Eliminate batch processing. Waiting for an appropriate number of applications to be received before processes added 2-3 weeks to the processing time.

Log activities Once. Logging activities in is redundant and time consuming.

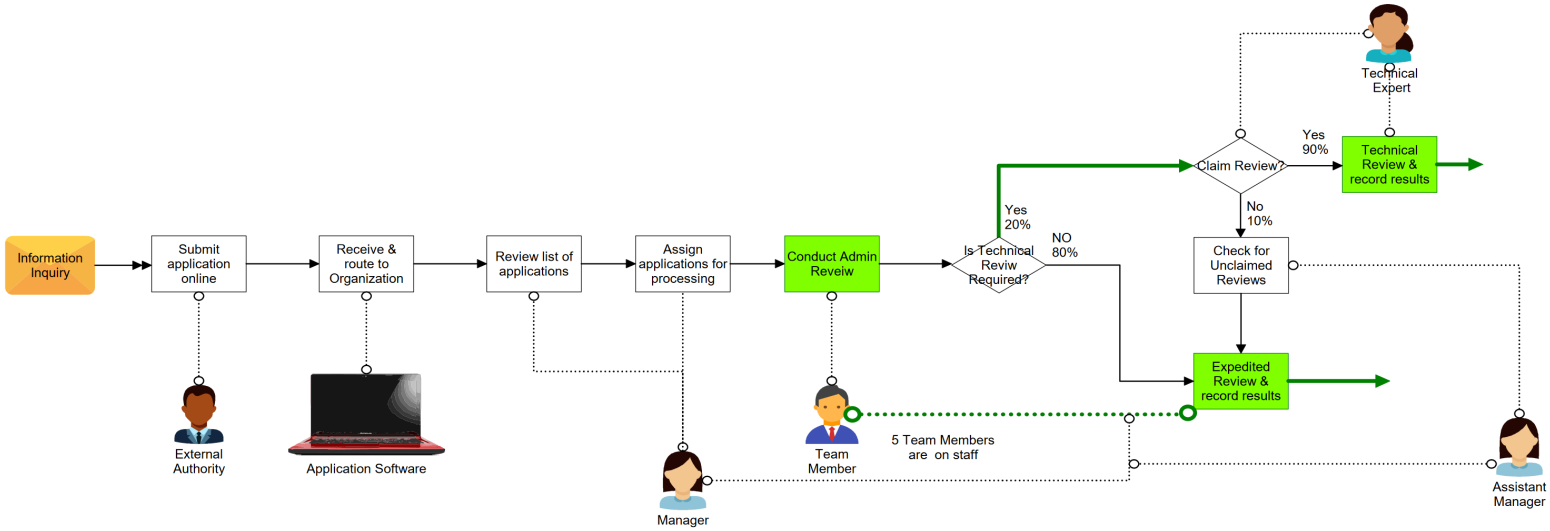
Team members perform expedited reviews. Initially only Leadership was performing expedited reviews. Training Team Members and having them perform expedited reviews, increases the resources available to perform reviews.

Remove all activities not pertinent to the expedited review process. The expedited review process is executed alongside a check list. The checklist was extensively reviewed and extraneous activities were identified and removed, resulting in a 33% reduction in time; reviews now take 60 minutes instead of 90.

Develop a Technical Review Checklist to ensure accuracy and to aid in timeliness. Historically, the checklist associated with the expedited review was well received and worked to help the timely completion of applications. A Technical Review checklist was then created resulting in the savings of 13%; the time to complete a technical review reduced to 7 hours from 8.

With the above improvements in mind, a simulation of the To-Be state (shown in next page) was developed to determine the impact of all the improvements.

Information Inquiry



To-Be Process

After development, the simulation was performed, emulating a six-month period. The simulation was performed 6 more times, and the average of all the results were calculated (shown below). During a six-month period, 624 applications can be processed, which each application taking an average of approximately 7 hours and costing $159 worth of labor to complete. Of those 7 hours, 3 hours of processing are done; the rest of the time the application is waiting in a queue.

Qty Processed	Average Cycle Time Min	Average VA Time Min	Average NVA Min	Average Touch Time Cost
624.00	419.87	192.13	227.74	159.12

With results from both the As-Is and To-Be states, an analysis of both simulations was performed. (shown below.) Across the board every metric was improved. Quantity processed increased by 28; time to process an application was reduced by 23%; time in the queue was reduced by 82%; the overall cycle time was reduced by 73%; and the cost to process an application was reduced by 36%.

	Qty Processed	Average Cycle Time Minutes	Average VA Time Min	Average NVA Min	Average Touch Time Cost
As-Is	595.83	1,546.03	248.37	1,297.66	$247.04
To-be	624	419.87	192.13	227.74	$159.12
Difference	28.17	1,126.16	56.24	1,069.92	$87.92

The improvements work for the current state. However, Alpha Beta Gamma expected an influx of applications to happen within a year. To account for the influx, both the As-Is and To-Be simulations were run again, emulating a six-month period with a doubling of applications coming in per week. The simulation was performed 6 more times, and the average of all the results were calculated.

	Qty Processed	Average Cycle Time Minutes	Average VA Time Min	Average NVA Min	Average Touch Time Cost
As-Is	1,012.17	6,628.45	248.29	6,380.16	$246.98
To-be	1193.50	635.16	191.35	443.81	$158.46
Difference	181.33	5,358.13	56.94	5,936.35	$88.52

The results above show two main takeaways. The suggested improvements are good for the influx of applications, and it also shows that the As-Is state would not be able to handle the influx of applications. Leadership would end up spending between 87%-97% of their time processing applications, and application time in the queue would skyrocket by almost 2 weeks

Further analysis shows that the improvements have a profound impact on the percentage of time the Leadership spend on processing applications, while having very small impact on the time that team members spend on processing applications, even though their responsibilities has increased. If the influx of applications is not taken into account, the identified improvements will help management spend approximately 37% less time processing applications. All other employees will spend around 1.5% less time on processing applications.

Accounting for the influx of applications with the suggested improvements implemented, managers would spend 57%-64% less time on processing applications. Technical Experts will spend almost 1% less time, and Team Members will spend 0.5% more time on processing applications, even though they are doing more than ever.

Current State

Role	Percent Time Dedicated As-Is	Percent Time Dedicated To-Be	Percent Difference
Manager	57.65%	17.72%	39.93%
Assistant Manager	51.86%	14.59%	37.27%
Total Team Member	18.47%	16.81%	1.66%
Total Technical Expert	16.40%	14.92%	1.48%

Doubling of Applications

Role	Percent Time Dedicated As-Is	Percent Time Dedicated To-Be	
Manager	97.31%	32.86%	64.45%
Assistant Manager	87.40%	29.96%	57.44%
Total Team Member	31.43%	32%	-0.57%
Total Technical Expert	28.96%	28.16%	0.8%

Benefits of Simulation

Process simulation offers numerous benefits that significantly enhance business operations. By supporting data-driven decisions, simulation enables improved decision-making, allowing organizations to base their strategies on accurate and comprehensive data. This leads to enhanced process efficiency as bottlenecks and areas for improvement are identified and addressed.

Cost reduction is another advantage; process optimization through simulation can quantify potential savings, making it easier to justify changes and investments. Additionally, simulation aids in risk mitigation by assessing potential risks and developing contingency plans, ensuring that organizations are better prepared for unexpected events.

Aligning processes with customer needs and expectations through simulation can lead to increased customer satisfaction. The ability to create good visualizations helps stakeholders understand the process better, while detailed analysis ensures that all aspects are considered. Simulation also allows for “what-if” questions to be explored risk-free and without disturbances, presenting opportunities to analyze various scenarios and their outcomes.

As a key component in change management, process simulation helps people visualize and understand the changes being proposed, fostering acceptance and smoother implementation. Overall, process simulation is an extremely useful tool for continuous improvement, providing a robust framework for analyzing, optimizing, and managing business processes effectively.

Process simulation is an invaluable strategic tool for businesses. It enhances decision making, drives process efficiency, and significantly reduces costs. Simulation ensures organizations are better prepared for unexpected events. By aligning processes with customer needs and creating visualizations, it fosters increased customer satisfaction and stakeholder understanding. Additionally, simulation aids in change management by visualizing proposed changes, promoting

acceptance and smoother implementation. Overall, process simulation offers a robust framework for continuous improvement, optimizing and managing business processes effectively.

For more information on how simulation can help you or your organization please contact The Efficiency Group at www.efficiencygroupllc.com.