4 December 2023 Fayza Dholasania, Jack Hu, Shan Maknojia

Executive Summary: IAM Valuation for HealthCo

Background

HealthCo's outdated identity and access management (IAM) system is causing major problems, including a recent data breach that involved a surgeon who ran through the hospital with his truck due to frustration with badge access. This incident has led HealthCo to reconsider its current IAM system, especially considering the potential impact on patient care and cybersecurity risks.

HealthCo has been facing increasing cybersecurity risks with a history of data breaches. This shows the limitations of HealthCo's existing IAM infrastructure. The breaches have also resulted in financial losses, regulatory compliance issues, and higher cyber insurance premiums. With this, HealthCo is considering investing in a modern IAM solution. The organization is already dealing with financial challenges, so they are even considering investing in MRI machines, which have a clear business case due to their net present value (NPV) of $25.68 million and a return on investment (ROI) of 100%. For the IAM solutions, they have been looking at SailPoint's proposed IAM solution: on-premise and software-as-a-service (SaaS).

This report will look at total cost of ownership (TCO), return on investment (ROI), net present value (NPV), cyber loss exposure (CLE), tornado graph and spider graph through @Risk, and loss exceedance curves through FAIR-U. Through this, HealthCo can analyze each option through quantitative arguments alongside qualitative ones and decide if they want to implement a new IAM solution or stay with the legacy solution.

Total Cost of Ownership

We start by looking at the total cost of owning, operating, and maintaining each option. For the legacy solution and factoring in its cost like maintaining, updating, and salary, the TCO for all five years is $16,197,023. For the SaaS solution and factoring in the subscription cost, number of users, training, and one-time setup fee, the TCO is $21,408,891. Lastly, for the on-premise solution and factoring in the licensing fee, infrastructure costs, one-time setup, and any labor for maintenance, the TCO is $18,744,833. Although the total cost of ownership is the lowest for the legacy option, it is important to consider the potential benefits the other options have, like lowering the number of breaches, allowing clinicians to have a better experience in the hospital system, cost reduction, and better integration with other hospitals in the system. Additionally, since on-premise and SaaS have a high initial setup cost, it's possible to make the money back over time. With this, we need to look at the returns and value for each solution through ROI and NPV.

Return on Investment

The ROI is a good financial metric that shows the profitability of an investment by showing the dollar return for each dollar invested. To find ROI, the equation is total cash inflows minus the total cash outflows then dividing it by the total cash outflows. The total cash inflows were based on three inflows: productivity savings, decommissioning of the legacy IAM system, and cyber insurance premium discount. The cash outflow was the TCO, as discussed earlier. With this, the ROI of the on-premise solution is 101%. This means that for each dollar invested, there is a return of $1.01 dollars. When looking at SaaS, the ROI is 87%. This means that for every dollar invested, there is a return of $0.87. Both options generate a positive ROI; however, the on-premise solution has a higher ROI, indicating a more favorable return on investment compared to the SaaS solution. While on-premise is better in this metric, it is important to evaluate whether the potential benefits justify the potential downsides and also align with the organization's strategic goals like decreasing cybersecurity risks. These can be addressed through other metrics mentioned below.

Net Present Value

Net Present Value, or NPV, is a financial metric used to evaluate the profitability of an investment by comparing the present value of expected cash inflows with the present value of expected cash outflows over a certain period of time. The way we calculated NPV for on-premise was by using a 10% discount rate and the series of all five years, which resulted in $12,640,198. Using the same logic as on-premise, we found the NPV for SaaS by also using a 10% discount rate and the five years giving us $12,608,527. Based on NPV, on-premise would be better because it has the highest NPV of about $12,640,198; however, SaaS is only about $31,671 lower than on-premise in NPV. To make a final recommendation, one has to look at all metrics holistically.

Cyber Loss Exposure

Cyber loss exposure (CLE) is crucial to factor in for businesses and organizations so they can effectively manage and mitigate cybersecurity risks. By understanding the potential financial impact of cyberattacks, organizations can make informed decisions about risk mitigation strategies and potential cybersecurity investments. Factoring in these savings or costs from cyber loss exposure into financial metrics provides a more comprehensive view of the overall expenses associated with our investment. After accounting for CLE given the most likely outcome, SaaS is the best option for HealthCo since it has the lowest cyber risk exposure of $341,470.

@Risk - Tornado graph and Spider graph

Now that we have seen NPV using static values, it is also helpful to perform sensitivity analysis by looking at how different values of an independent variable impact NPV under a given set of assumptions. We first defined distributions for input variables, then we ran 10,000 iterations of Monte Carlo Simulations for both the on-premise and SaaS solutions. The results we get can be seen in Figures 1-6. Although the NPV distribution of SaaS showed a maximum NPV of around 36 million, it also showed a potential minimum NPV of around -21 million (Figure 2). The NPV distribution for on-premise, on the other hand, has lower variability, with a maximum of around 25 million and a minimum of around 5 million dollars (Figure 1). Therefore, if HealthCo is willing to take risks and wants to achieve the maximum possible NPV, SaaS is the best option. Alternatively, if HealthCo's goal is to be risk-averse and wants a guaranteed positive NPV then on-premise is the better option.

The tornado graph for on-premise shows the discount rate of HealthCo, the annual growth rate of employees and contractors, the target reduction rate, the growth rate of employee salaries, and the inflation rate are the top 5 factors that affect the NPV (Figure 3). The tornado graph for SaaS shows the percent of employees and contractors who use SaaS, the annual growth rate of employees and contractors, the discount rate of HealthCo, the annual growth rate of employee salaries, and the target reduction rate are the top 5 factors that affect the NPV (Figure 4). After selecting a SailPoint solution, it is vital for HealthCo to focus on the top influential factors that correspond to the solution to control the variance of NPV.

Of the lines shown by the spider graph for on-premise, the two lines with the most noticeable slopes are the discount rate of HealthCo and the annual growth rate of employees. The spider graph shows that the higher the discount rate and the higher the growth rate of employees and contractors, the lower the NPV will be (Figure 5). The spider graph for SaaS showed similar results as on-premise, with the discount rate of HealthCo and the annual growth rate of employees having noticeable slopes. However, the spider graph for SaaS also showed the percentage of employees and contractors who use IAM as a line with a noticeable slope. The spider graph shows that the higher the percentage of

employees and contractors who use IAM, the higher the discount rate, and the higher the growth rate of employees and contractors, the lower the NPV will be (Figure 6).

FAIR-U - Loss Exceedance Curves

Loss Exceedance Curves are a vital tool in risk management, providing a visual representation of the probability of a loss event exceeding a certain threshold. Using Fair-U, the loss exceedance curve for legacy IAM showed the most mean loss of around 64.4 million dollars (Figure 7). The IAM options offered by Sailpoint greatly reduced the mean loss to 10 million if doing on-premise (Figure 8) and 2.3 million if doing SaaS (Figure 9). Therefore, if only looking at the loss exceedance curves, the SaaS is the best option, resulting in the most loss reduction by minimizing the area under the loss exceedance curve.

Budget Constraints

The way we found the budget for the individual sectors was by taking the total IT budget and multiplying it by the percentage of how much of the total budget it takes up. For example, IT OpEx takes up 80% of the IT budget, so we did $1.5 billion * 80% giving us $1.2 billion. IT security OpEx is $60 million. IT CapEx is $300 million. IT security CapEx is $6 million. Although both SaaS and on-premise meet under budget, we recommend SaaS since the net cash flow in the first year is -$1,738,322.48, which is below the budget for both IT security OpEx and CapEx, which implies that HealthCo can implement SaaS and MRI proposals without exceeding the budget. Although the on-premise solution reflects a positive net cash flow over the five years, which meets the ROI and NPV goals while reducing Cyber Loss Exposure, it starts with a higher negative cash flow (-$2,748,072.48).

Recommendation

We recommend implementing SaaS since this can help address the challenges the HealthCo was facing. Although SaaS has lower NPV and ROI than on-premise, the numbers are still comparable, where the NPV for SaaS is only $31,671 lower than on-premise. Additionally, given that HealthCo has many mergers and acquisitions and has no integrated IT systems, a solution that can support scalability would be beneficial like SaaS, potentially lowering any cybersecurity risks as well. Furthermore, the provider of the SaaS, SailPoint, will be responsible for maintenance, security, and support, which will reduce the burden on HealthCo. Sensitivity analysis also showed the SaaS option having the highest maximum reachable NPV of around $36 million. Although the sensitive analysis for SaaS showed a negative minimum value, the NPV is still positive at the 5th percentile with a value of around $1.8 million (Figure 2). This means there is less than a 5 percent chance that HealthCo will have a negative NPV by adopting the SaaS option, making SaaS a still safe option. There can be negotiations done with SailPoint to lower initial costs and other costs, which in turn can increase the NPV and ROI, surpassing the on-premise solution. Lastly and importantly, SaaS can help meet the business's strategic goal of lowering cyber threats and increasing IAM performance within the organization. On average, SaaS has the lowest cyber loss exposure and lowest mean loss based on the loss exceedance curves, which is important since HealthCo has been facing breaches annually.

Appendix

Figure 1

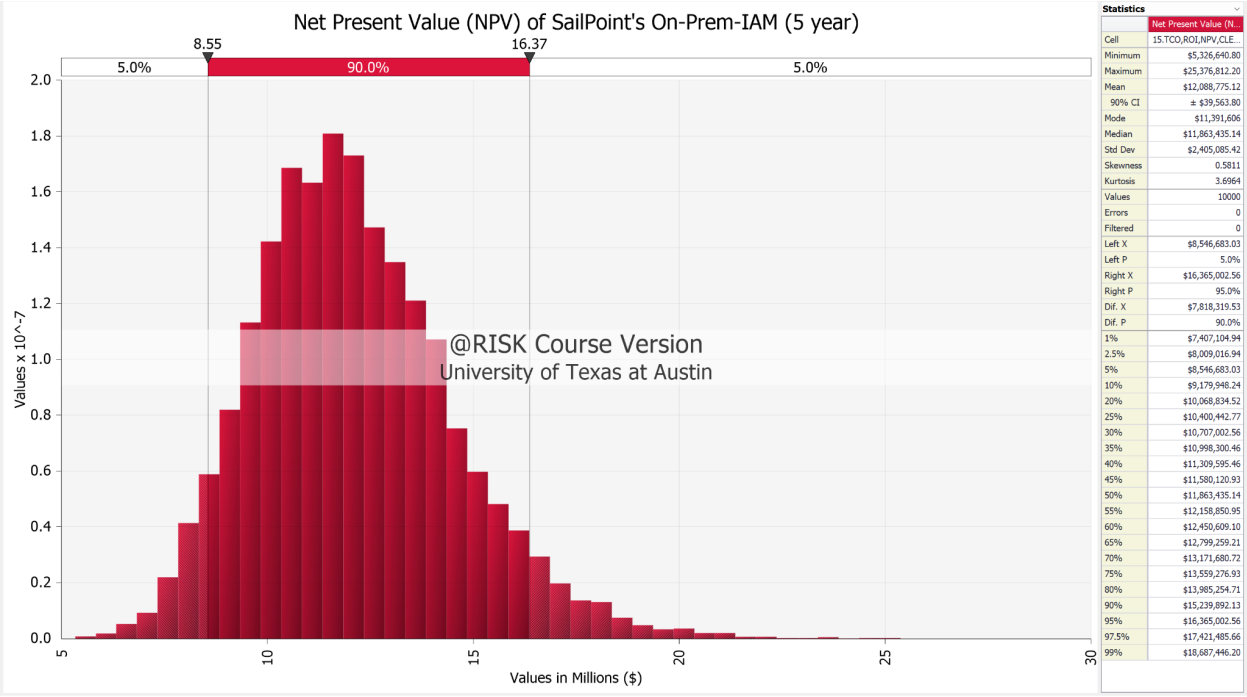


Figure 2

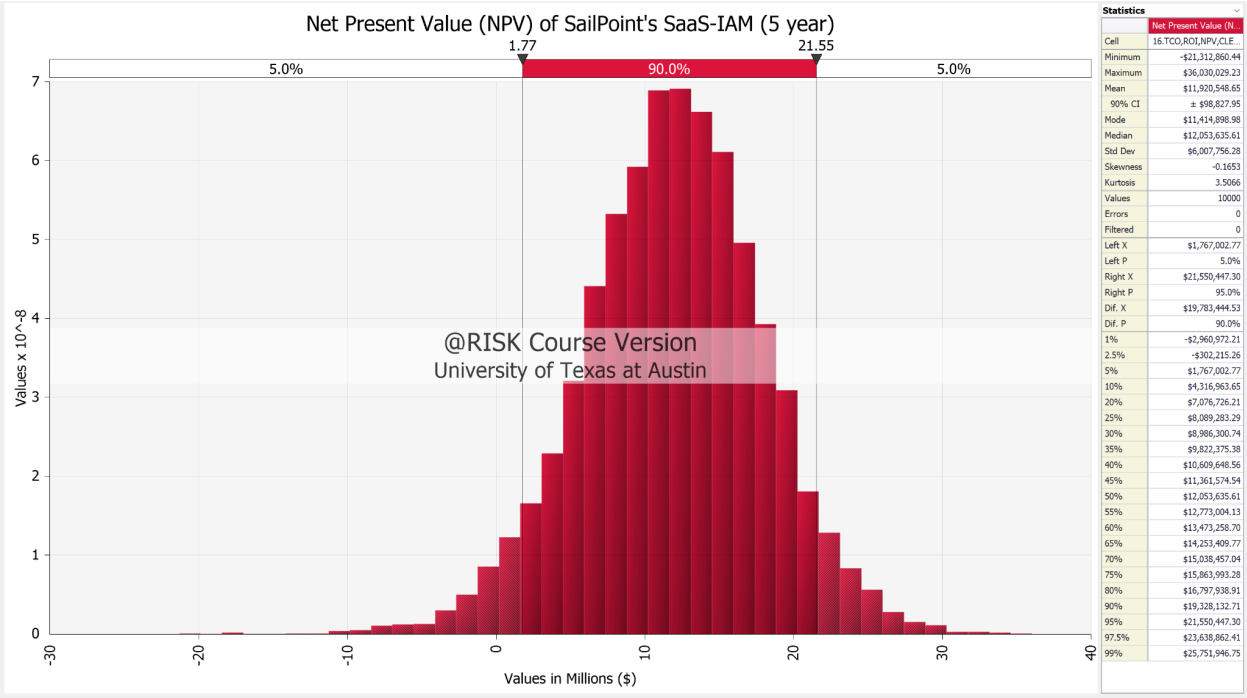


Figure 3

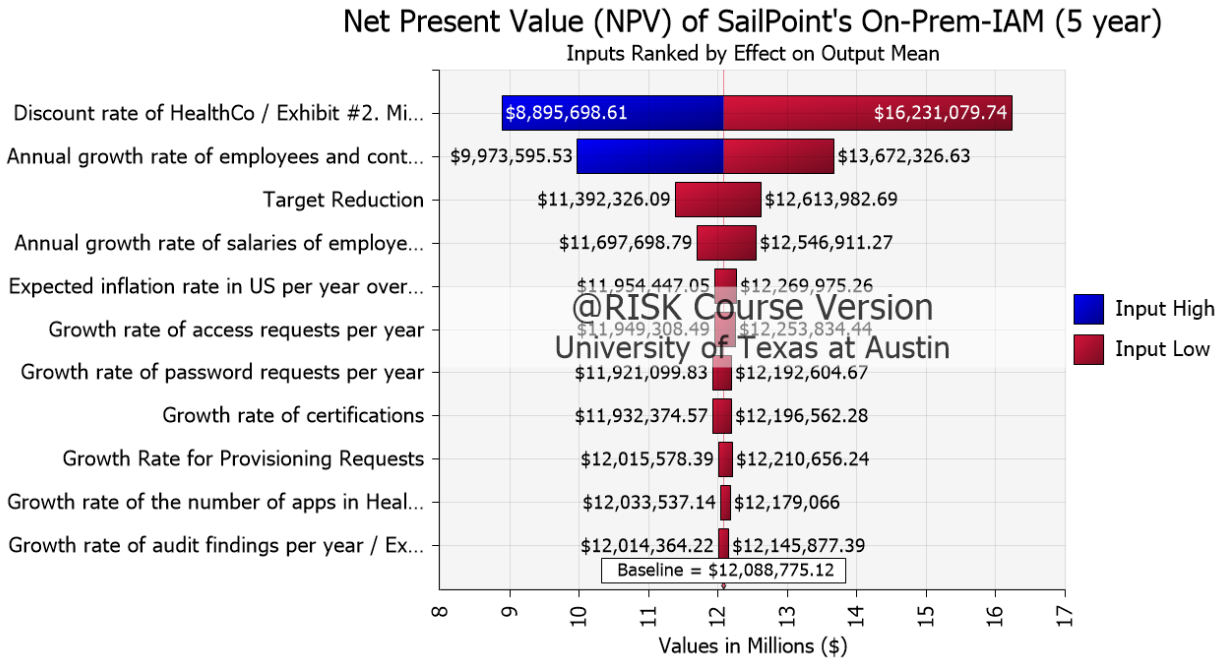


Figure 4

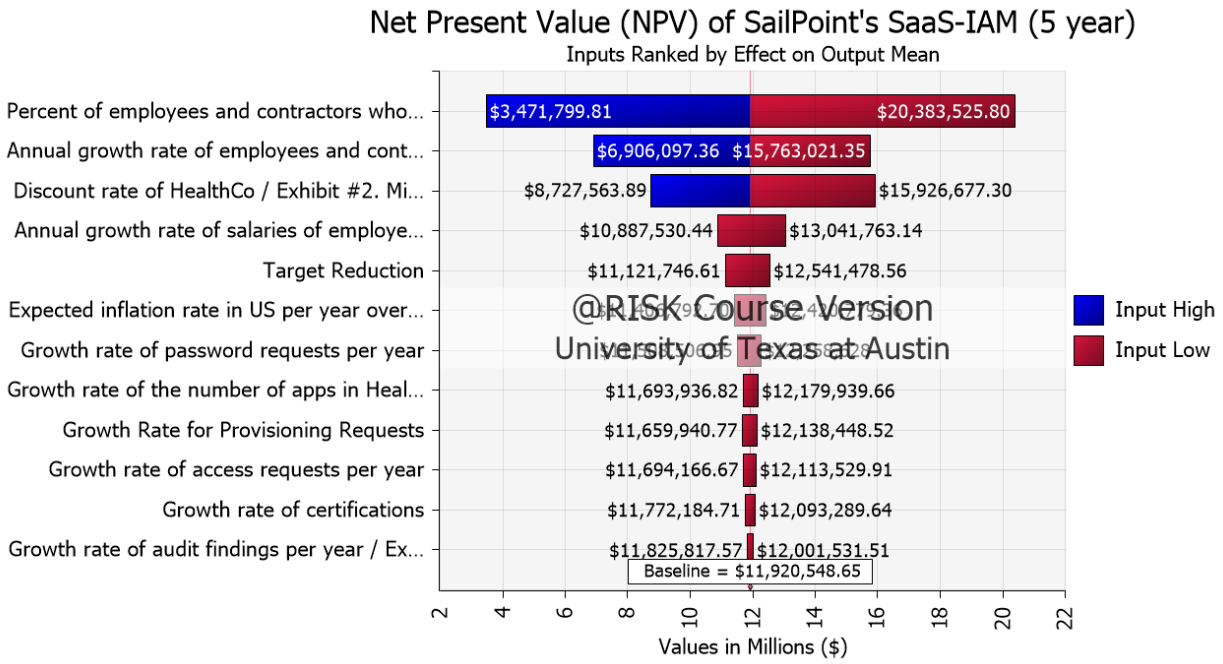


Figure 5

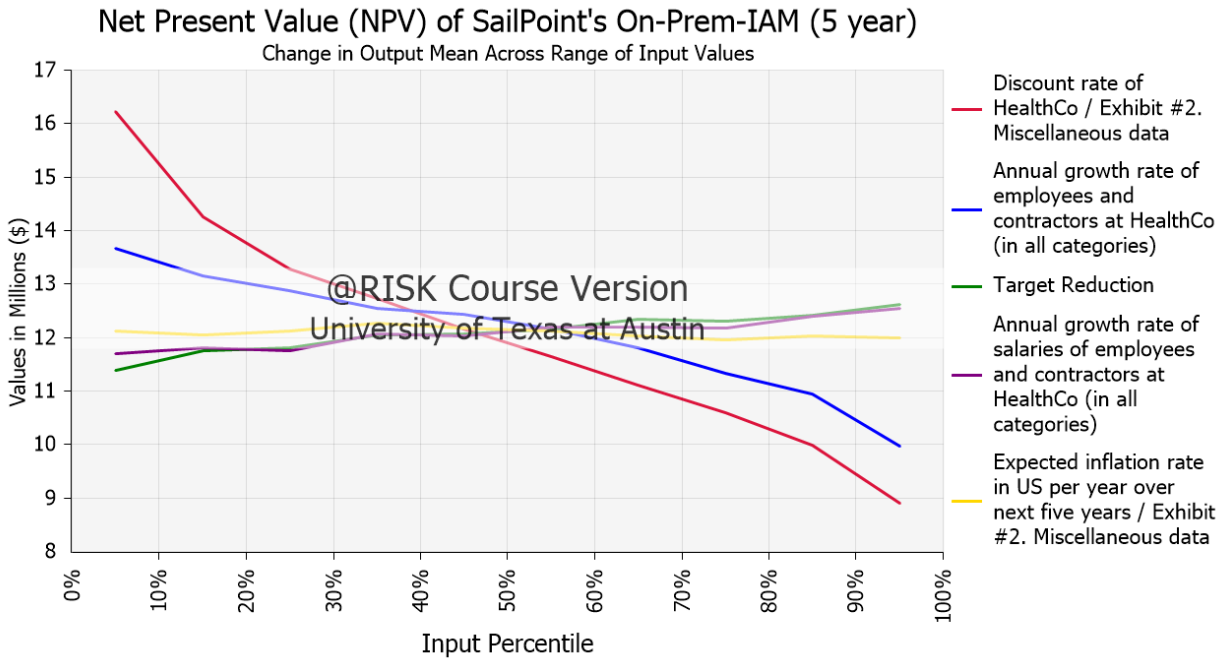


Figure 6

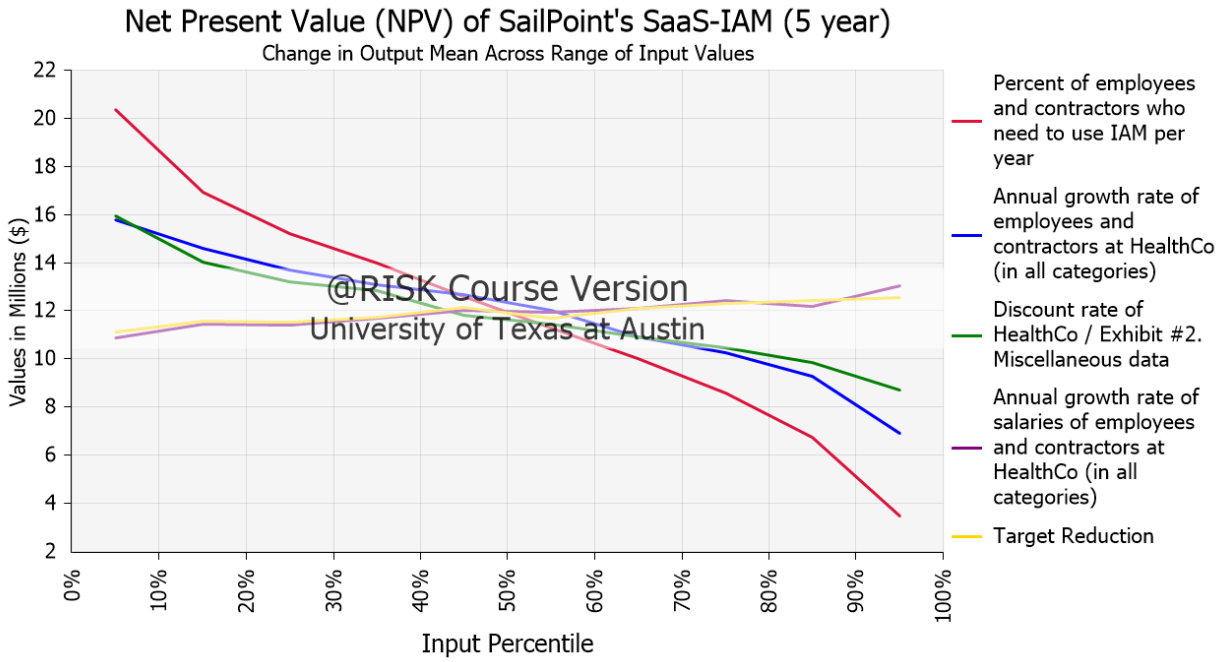


Figure 7

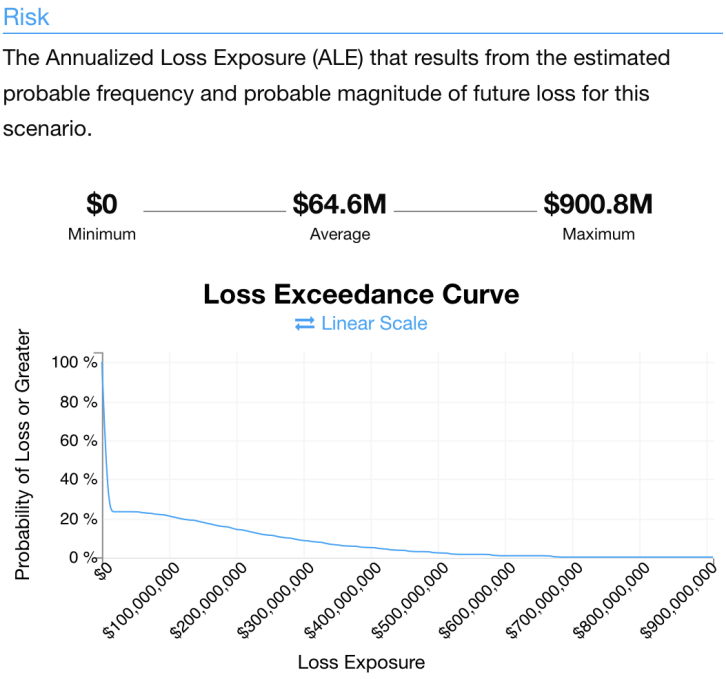


Figure 8

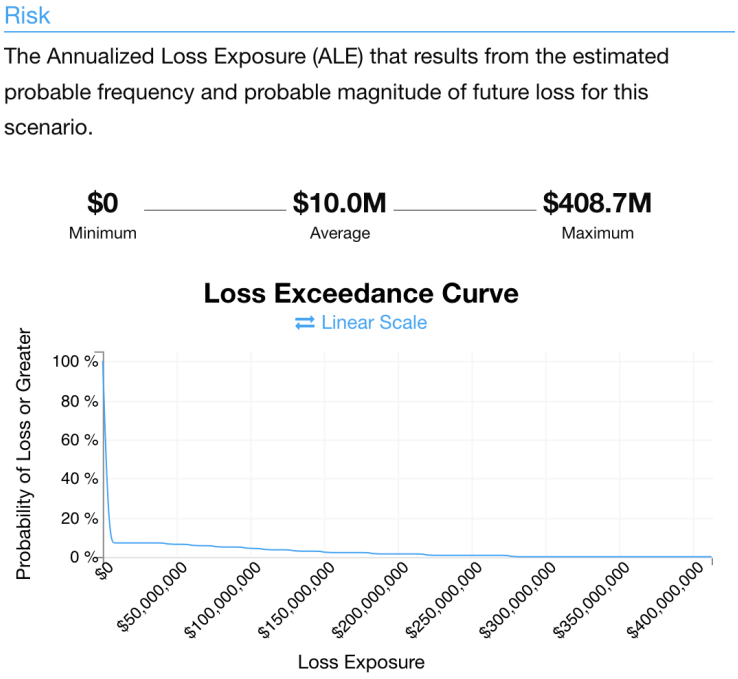
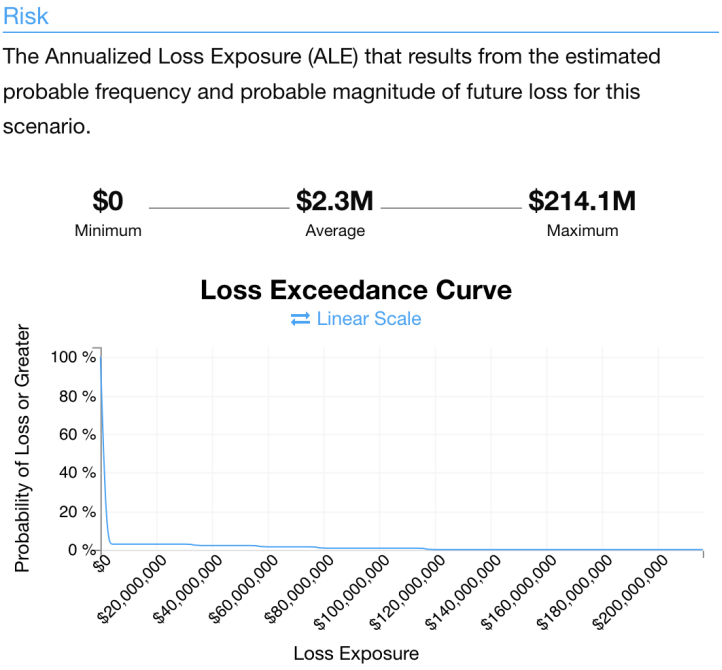


Figure 9


Risk
The Annualized Loss Exposure (ALE) that results from the estimated probable frequency and probable magnitude of future loss for this scenario.
$0
Minimum
$2.3M
Average
$214.1M
Maximum
Loss Exceedance Curve
Linear Scale
Probability of Loss or Greater
100 %
80 %
60 %
40 %
20 %
0 %
$0
$20,000,000
$40,000,000
$60,000,000
$80,000,000
$100,000,000
$120,000,000
$140,000,000
$160,000,000
$180,000,000
$200,000,000
Loss Exposure