

SOFTWAREHOUSE

**Information Technology
Software**

**Medium difficulty
Interviewer-led case**

This case considers the decision for a software company to move to a cloud-based computing platform. It covers all elements of the case interview scorecard other than creativity, with stretch areas in Structuring and Numeracy.

This case includes an optional question testing a candidate's Information Technology expertise and will be suitable for those applying for consulting roles specialized in this area. Such questions may be skipped by other candidates.

Problem definition

Your client, SoftWareHouse, is a small software company that provides an analytics platform for business customers. The platform enables customers to store, manipulate, and perform analyses on large data sets.

Currently the client runs all the infrastructure for its web services on-premise, i.e. on servers that SoftWareHouse purchases and maintains itself. The client's infrastructure is up for renewal, however, and SoftWareHouse is considering a move to a cloud-based model instead of renewing its on-premise appliance. In the cloud-based model, the client would leverage the infrastructure and compute power from a third party to provide its services.

The client has asked you to analyze this opportunity, and to determine whether it should move to a cloud-based model.

Additional information

- If asked about the client's objective, share that while we don't have precise details, the client is looking for improved economics, while at least maintaining current service level for customers
- If required, explain that cloud computing is the practice of using a network of remote servers hosted off-premises and accessible via the web to store, manage, and process data. Several large companies (e.g. Amazon, Google, Microsoft) offer access to cloud computing services, and smaller companies pay for use of these services as an operating expense

Question 1 (Structuring)

What are the different areas/aspects that the client should consider as they think through this decision?

Possible answer

1. *Economic factors: Will this move offer a positive economic return?*
 - a. *Investment requirement, if any (e.g., migration costs from our current on-premise platform)*
 - b. *Difference in running cost between the two options*

2. *Quality factors: does the service level at least match out current solution?*
 - a. *Speed and performance level*
 - b. *Features (e.g., does it enable at least as good a suite of analytical tools?)*
 - c. *Ease of scalability (i.e., can more client data be added and processed quickly and easily?)*

3. *Risk factors:*
 - a. *Security: Are there risks to relying on a third-party from a security perspective?*
 - b. *Business model dependency: Is the client comfortable outsourcing its core infrastructure to a third-party cloud provider?*

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Question 2 (Information Technology expertise question)

The client wants to begin by exploring the potential quality and security advantages of a move to a cloud-based platform.

Thinking creatively, what benefits to service quality or security do you think a cloud-based architecture could provide?

Additional information

If asked, please share that it's acceptable to re-cap things from the structure, but the candidate should build on them and develop them with more specific ideas and examples.

Possible answer

Security and reliability benefits:

- *Improved security infrastructure (e.g., if we're piggy-backing off a bigger player for our cloud platform, we may benefit from a more advanced security architecture)*
- *Distributed architecture decreases the risk of a single point of failure for us and our clients*

Performance benefits:

- *Access to more computer power*
- *Regional distribution to enable better latency for clients located far from our HQ*

Feature benefits:

- *Features we cannot offer economically in-house (e.g. GPU environments)*
- *Scale we cannot offer in-house for practical reasons (e.g. massive data storage)*

Question 3 (Judgement & Insight)

SoftWareHouse is looking at potential models with which to offer a cloud computing solution. They're considering two models in particular:

1. On-demand: SoftWareHouse pays for the server on a monthly basis and there is no long-term commitment. The price of each server is \$10,000/month
2. 3-year reserved model: SoftWareHouse gets a discounted rate but has to commit to a 3-year usage horizon. The price of each server is \$4,000/month, and the client will be charged this amount for the entire 3-year period

The client can use either one of these models, or a combination of the two. In any scenario, all bills for services are paid at the end of a given year. Take a look at this exhibit [share Exhibit 1], which shows expected traffic for the client.

Based on this traffic pattern, which cloud model should the client prioritise?

Additional information

If asked, please share that:

- A given 'server' can handle 100 views per second
- The traffic pattern in the exhibit has been smoothed for ease of analysis

The candidate should ideally ask the reason for the spike. The spike is due to a month-long promotion at the end of every 6 months that the client runs. This promo drives significantly more demand than usual, from both new and existing customers

The candidate may run the precise numbers for a number of scenarios, but the solution can be arrived at through eyeballing the demand and cost numbers alone, and/or running quick sense-check calculations as per the answer below.

Possible answer

The client should use a combination of the on-demand and 3-year reserved model.

The 3-year reserved model is significantly cheaper per month, so we should use this where possible.

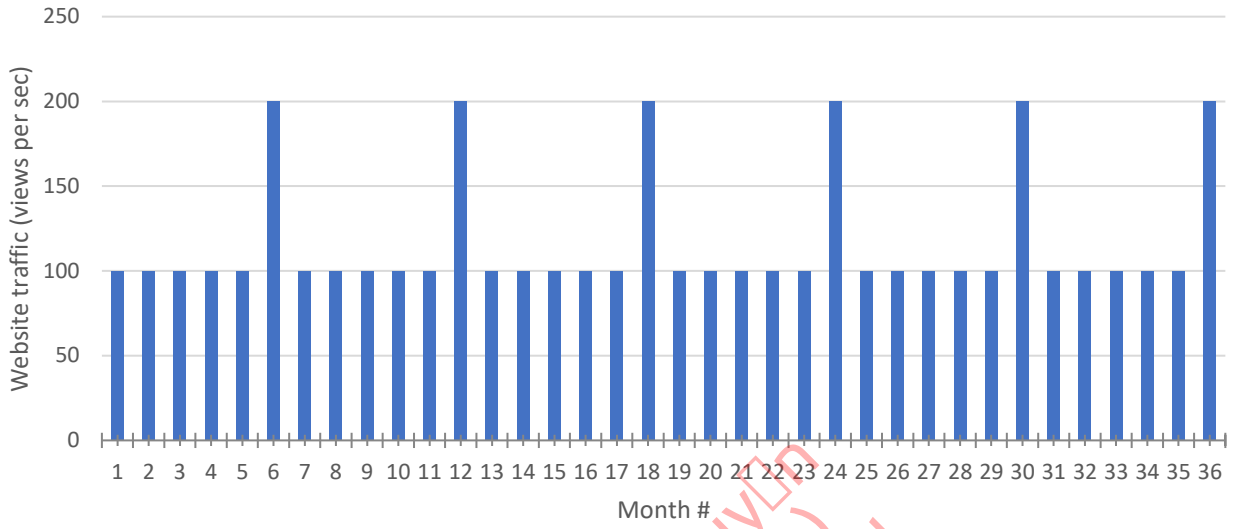
The 3-year model costs only \$48,000 per year; at five or more months of 'spike' demand for \$10,000 per month, it makes sense to use a reserved server over an on-demand one.

Here the client can use a reserved server to meet its base traffic of 100 views per second almost precisely. It should also use an on-demand server for the two months of traffic spikes per year.

This model would cost the client \$68,000 per year (\$48,000 for reserved server, \$20,000 for the two months of increased demand).

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Exhibit 1: Expected traffic pattern for client's w



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Question 4 (Judgement & Insight)

The client wants to consider another scenario, seen in this exhibit [share Exhibit 2].

If the traffic pattern was to change to what we see in Exhibit 2, how would your recommendation change?

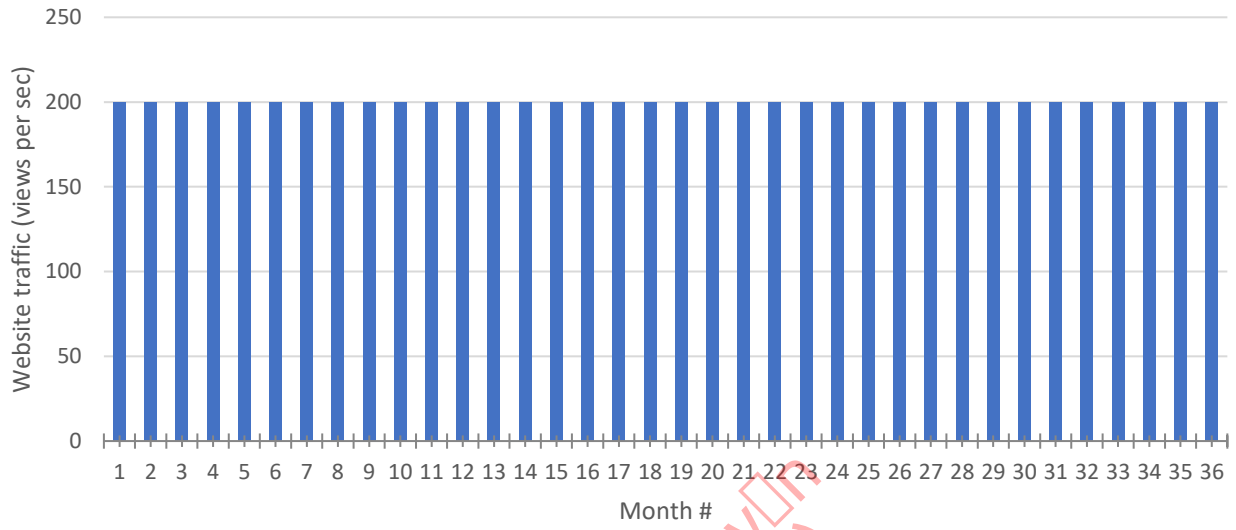
Possible answer

In this case, the client should invest in 2 servers of the 3-year reserved model. The total monthly cost would be $\$4,000/\text{server} \times 2 \text{ servers} = \$8,000$ per month, or $\$96,000$ per year.

If the client decided to deploy an on-demand server then the total monthly cost will be $\$10,000/\text{server} \times 2 \text{ servers} = \$20,000$ per month. It's therefore clearly in the client's interest to use the 3-year reserved model in this scenario.

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Exhibit 2: Hypothetical traffic pattern



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Question 5 (Numeracy)

Let's go back to Exhibit 1, and assume that this scenario reflects the traffic pattern the client's likely to experience.

The client wants to compare a cloud-based option against renewing its infrastructure with a new on-premise appliance. Let's assume the CAPEX for putting in place one on-premise server for the 3-year period is \$80,000.

From a purely cost perspective, should the client still consider a fully cloud-based model, or should it use on-premise servers?

Additional information

If asked, please share that:

- If required, prompt the candidate with the need for an NPV calculation to compare the on-premise and cloud computing servers. The candidate should compare the two scenarios under a 3-year timeframe
- Assume a 10% cost of capital
- It's fine to use approximations for the calculations, and indeed this is likely required to compute the numbers in time. For example, there's no need to compute $(1+0.1)^3$ precisely on paper; 1.3 is a fair approximation.
- A strong candidate should ask about the OPEX cost to maintain an on-premise server, but this should be shared directly if it's not asked for. The OPEX cost is \$20,000 per year per server, reflecting cost for running and maintaining servers on-premise
- Costs in both scenarios can be assumed as stable over the 3-year period (e.g., we should not build in cost increases for use of cloud-based servers)

Possible answer

We should compare the net present value of the two alternatives to determine the best option.

NPV for cloud model

The client will need to put in place one 3-year reserved server for the entire 3 years and will need to deploy one on-demand server every 6th month.

Therefore, the total annual cost will have 2 components:

3-year reserved server: 1 server x \$4,000 / month x 12 months = \$48,000 per year

On-demand server: 1 server x \$10,000/month x 2 months = \$20,000 per year

Total: \$68,000

The annual cost for year 2 and year 3 will remain the same as year 1. Therefore, we will need to consider the NPV of 3 cost streams of \$68,000 each at the end of first, second and third year (as all the bills are to be paid at the end of the year).

$$NPV = [\$68,000 / (1+10\%)] + [\$68,000 / (1+10\%)^2] + [\$68,000 / (1+10\%)^3]$$

$$\text{Simplifying, this calculation can be interpreted as: } [\$68,000 / (1.1)] + [\$68,000 / 1.2] + [\$68,000 / 1.3]$$

$$= [\$62,000] + [\$57,000] + [\$52,000]$$

$$\text{Total NPV} = \$171,000$$

NPV calculation for on-premise model

To meet all the traffic, the client would need to put in place 2 on-premise servers.

Total CAPEX = \$160,000 (\$80,000 per server for the period)

The OPEX will be \$40,000 per year, based on \$20,000 per year per server. Even before running the full NPV, we can see that this option is disadvantageous based on cost.

The total NPV for the cloud computing model is much less than the NPV for the on-premise model.

Therefore, assuming the traffic pattern in Exhibit 1, SoftWareHouse should opt for the cloud computing model from an economic perspective.

Question 6 (Synthesis)

Based on the analysis so far, how would you recommend SoftWareHouse proceeds?

Possible answer

We were asked whether SoftWareHouse should move to the cloud for its analytics service. Based on what we've seen, I recommend that the client should move to the cloud for the following two reasons:

- *The economics look positive vs the on-premise model*
- *There are likely to be additional service benefits to a cloud solution, such as greater security and feature benefits.*

As a next step, we should review our assumptions on service benefits to make sure this is a competitive solution for SoftWareHouse's customers. We should also consider the implementation plan to make the transition to the cloud successful.

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