# Star 2-1-2022 National General Insurance

Situation:

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## Task:

Business unit reporting delay in updating producer license data. A backend service which processes data from a 3rd party Api started taking days to complete. Normally it takes hours.

## Action:

As the owner of this process I setout to try and figure out what caused it to slow down.

1st I started looking at the logs which I could see the process was taking 36-48 hours to finish. I then started looking at older logs hoping to see when this started. Apparently, it started about sometime in Feb 2022. Logs for the prior month revealed the normal processing time of 6-8 hours. I now knew WHEN the issue started.

2nd Now that I knew when the slowdown occurred, my next step was to figure out WHY. For this I had to ask the question “what changed”? Fortunately, we keep detailed release notes and all our code changes are tied to a work item in Azure DevOps. So, I started looking at everything we released during the month when the slowdown started. Nothing really stood out. No smoking guns.

3rd With no obvious code issue sticking out it was back to troubleshooting 101. In an attempt to eliminate any infrastructure changes which might have caused this I ran the application in a test environment. While running the application I was watching the logs and over time the amount of time it took to process an individual producer was steadily increasing. This indicated that the process was slowing down as it ran. I then re-started the process, but this time I had the Windows task manager open to watch the process as well as the logs. Now I could see the memory usage going up, up, and up. It never leveled out. Eventually it took all the available memory on the VM! I asked the infrastructure people to double the RAM from 8gb to 16gb and re-started the process. As I suspected it took all the extra memory as well. At this point I was confident I had a memory leak. The question remained “what was causing the memory leak”.

4th Now that I knew I had a memory leak, and that leak did NOT occur prior to the Feb 2022 release I knew some code change caused this. But what? Since this process runs on a Windows VM I was able to run it in the test environment and create a memory dump while it was running. This would give me a runtime snapshot of what was going on internally. Well it turns out our corporate version of Visual Studio did not have the feature which allows you to inspect a memory dump. I took it upon myself to install JetBrains dotMemory (the .Net memory profiler). Armed with this tool I could now see the objects in my application as they existed while running. There were approx. 92 million CLR objects in this 6.8gb memory dump file. From this I could clearly see millions of our EF Core DB contexts were not getting disposed. WHY? Everything was properly wrapped in a C# using statement. What changed?

5th “What would cause all of our EF Core DB contexts to not dispose themselves”? To answer this question, I had to go back into our Git history to see the code commits for the Feb 2022 timeframe. I wanted to see if any of them changed. SURE, ENOUGH THEY DID! While upgrading the application from .Net 3.1 to .Net 5 one developer re-factored all the EF Core DB contexts. Moving their creation inside the DI container. I now knew we had an issue disposing EF Core contexts in Net Core 5! It is at this point I started Googling for an answer.

6th All our EF Core DB contexts were now registered as “Transient” in the DI container. This was a change from the original code where we created the contexts manually in the code. Now we were passing the creation job to the .Net DI container. The smoking gun and the solution came to me as I was scanning a EFCore GitHub issue entry. *“When you register a transient service which implements IDisposable, by default the container WILL HOLD onto these references and NOT dispose of them until the container is disposed when the application stops”* By moving these contexts into our DI container and registering them as transient we inadvertently prevented them from ever getting disposed by the garbage collector.

Result:

Now that I knew what was going on all we had to do was to revert the changes specific to the EF Core DB context refactor. I reverted the changes and re-deployed the code to our test environment. Sure enough the memory leak went away.

# Why am I

I want to get back to building products. For the first 3 years I worked on PLL (Producer License Library). This was a high visibility project run by a well respected senior architect. Joining his team was exciting as I was learning and building alongside on of the top performers at the company! The experience was incredible. As the project wined down the architect passed the ownership of this product to me and moved on. Today I am this product’s team lead, managing 2 full time developers, as we continue to support and enhance this product.

Recently my group “Enterprise Services” took control of a very old suite of Api’s and batch processes called “vendor services”. This code was written over 10 years ago in an outdated language by outsourced development teams. Since I had great success with PLL leadership determined that I would be perfect to take on these new responsibilities as well. I had no idea what I was in for. Since taking over these legacy services my team spends about 50% of their time just keeping these services operational! Some of the daily tasks we now much take on include:

* + Manually updating data in test environment to support other teams testing efforts.
  + Manually updating data in production environments. There are applications which we do not own or control which may corrupt the data in a database we now own. When this occurs, we must manually fix the data.
  + First point of contact if some service does not work as expected.
  + As there are over a dozen applications calling these services from various parts of the organization, we are now required to scan several e-mail distribution lists for signs of trouble with these services.
  + We do not know all the application which use these services as cross company communication is very much lacking.
  + Very much in the dark about decisions which affect my team. I am not able to accurately forecast or plan as I have no awareness of upcoming projects or initiatives. I find out things that directly affect my team second hand, like a RabbitMQ implementation or a cloud migration that affected our services.

The first 3 years were great as we built a killer application suite along with a great team. Then in early 2022 management decided to assign my team a legacy service layer which was over 10 years old. Now my team spends half of its time simply supporting this service layer.

General Behavioral Interview Questions:

What makes an ideal coworker in your eyes?

How do you prioritize projects under pressure?

How would you handle your schedule when it’s interrupted?

Have you ever bent company policy to satisfy a client?

How have you handled setbacks at work?

How do you handle job training if it’s going poorly?

Have you ever calmed down an angry client? How?

Tell me about some regrets in your previous job

Communication Behavioral Interview Questions:

Tell me how you communicated with your previous managers?

Give an example of when you persuaded someone at work towards your point of view. Was it a positive outcome?

Can you talk about a time when you were unable to get your point across effectively? What contributed to this? Have your communication skills improved?

Describe a time when you had to give a presentation in a group setting.

Tell me about a time when you had to deal with a difficult client or customer. How did you handle the stressful situation?

Can you talk about a time when you had to deliver bad news to someone? What did you do to prepare and what was the outcome?

Teamwork Behavioral Interview Questions:

Describe a time when you had to work with a difficult coworker. How were you able to handle interactions with that person?

Give an example of when you needed information from a coworker who wasn’t responsive? What did you do?

Describe a time when you worked as part of a team on a project. Explain your role within the team and the actions you took to contribute to the team.

Talk about a situation when your team members disagreed with you. How did you handle it?

Can you tell me about a time when a coworker was not doing their work on a difficult project? What did you do?

Describe a time when you and your team members were forced to compromise. Explain the results.

Adaptability Behavioral Interview Questions:

Describe a time where you did everything you could think of but still failed to achieve your desired result. What happened and why were you unsuccessful?

Tell me about a time when you made a mistake or overlooked a solution to a problem and learned from it. What have you done because of this experience?

Can you talk about a time when you had to embrace a new system, technology, process, or way of thinking that was a major departure from the previous way of doing things? Did it become a success story?

Tell me about a time when you were assigned a task outside your normal job duties. How did you handle the assignment? Describe the outcome.

Can you talk about a time when you adapted to a change and your coworkers resisted changing from the old way of doing things?

Talk about a task that had a major obstacle. How did you get around that obstacle to complete your task?

Can you talk about the biggest change you experienced? How did you adapt to the change?

Ethics Behavioral Interview Questions:

Tell me about a time when it was difficult to be honest because of the situation. What was your thought process?

Can you describe a time when you followed a rule you didn’t agree with? Why did you follow it? Explain how you felt.

Have you ever been in a challenging situation at work where you were dishonest? What happened?

Growth Potential Behavioral Interview Questions:

Describe a situation where your superior was not around and a problem developed. How did you handle the problem? What were the results?

Tell me when the last occasion you asked for direct feedback from your manager and why?

Is there something that would motivate you to move from your current position?

What is a big career goal that you achieved recently?

Was there a time you were passed over for a promotion? Was it fair?

Prioritization Behavioral Interview Questions:

Think about a time when you were overwhelmed and stressed. How did you handle it?

Describe a project you planned. Explain how you organized and managed the assignment.

Have you ever worked on multiple projects at the same time? How did you manage your time and what were the results?

Tell me about a time when you were able to delegate an important task that succeeded.

How do you estimate a reasonable time to complete a task?

Leadership Behavioral Interview Questions:

Describe a time when an employee approached you with concerns. Explain how you handled the situation.

Tell me about a time when a project’s priorities had to change. Explain the steps you took to start the change.

Can you talk about a time when you had to build credibility with stakeholders? Describe the actions you took.

Can you talk about a time when you discovered new information that affected a decision you had made already? Explain how you proceeded?

Talk about a time you presented a great idea to management but there wasn’t a buy-in. What was your next move? Did you change their minds?

Do you know of any changes in or industry that may cause a disruption? If so how should we go about meeting these challenges?

Tell me about something that challenged you as a leader? Did this change your way of thinking? Did it improve your leadership abilities?