Task 1: Respond to a noted software issue, and document the solution and resources required to resolve the issue. (490 words)

Issue Report

Date: 26th May 2024 **Reported by:** Jane Doe

Department: Customer Support **Software Version:** XYZ CRM 4.2

Issue Description: Customers are experiencing frequent crashes when trying to generate reports in the XYZ CRM system. This problem seems to occur primarily when large datasets are involved.

Analysis

Initial Diagnosis:
Upon investigating the issue, the system appears to run out of memory when handling large datasets during report generation. This leads to the software crashing unexpectedly.

Logs and Error Messages:
The application logs indicate a consistent pattern of memory allocation failures. Error messages include "OutOfMemoryError" and "Heap space exceeded."

Solution

Steps Taken to Resolve the Issue:

1. **Increase Heap Memory Allocation:**
    - **Action:** Adjusted the JVM (Java Virtual Machine) options to increase the maximum heap size.
    - **Details:** Modified the JVM arguments in the application's startup configuration file to `-Xmx4G` from `-Xmx2G`.
2. **Optimize Report Generation Queries:**
    - **Action:** Reviewed and optimised the SQL queries used in the report generation process to reduce memory consumption.
    - **Details:** Indexing was added on frequently queried columns and optimised joins to minimise the data processed in memory.
3. **Implement Data Chunking:**
    - **Action:** Implemented a data chunking mechanism to process large datasets in smaller, more manageable chunks.
    - **Details:** Modified the report generation logic to process data in 100,000 record batches instead of loading all data simultaneously.
4. **Update Documentation:**
    - **Action:** Updated the internal documentation to reflect the changes made to memory allocation and report generation process.
    - **Details:** Documented the new JVM settings and query optimisations for future reference.

Testing:

- Conducted tests with various dataset sizes to ensure the changes effectively resolved the crashing issue.
- Verified report generation time and memory usage improvements.

Deployment:

- Deployed the changes to a staging environment for further testing by the QA team.
- Scheduled deployment to the production environment during the next maintenance window.

Resources Required

1. **Technical Resources:**
    - Access to the application's configuration files and source code repository.
    - Database administrator to assist with query optimisation and indexing.
2. **Tools:**
    - JVM monitoring tools (e.g., JVisualVM) to monitor memory usage.
    - SQL profiling tools to analyse and optimise database queries.
3. **Human Resources:**
    - Software developer to implement the changes.
    - QA team to test the changes in a controlled environment.
4. **Documentation:**
    - Internal wiki or knowledge base for updating the documentation.

Follow-Up

- **Monitor:** Monitor the application's performance post-deployment to ensure the issue is fully resolved.
- **Feedback:** Gather user feedback to confirm that the report generation process is now stable and efficient.
- **Iterate:** If any additional issues are identified, iterate on the solution to enhance performance and stability.

Conclusion:
The reported issue with XYZ CRM crashing during report generation has been addressed by increasing heap memory, optimising SQL queries, and implementing data chunking. The changes have been documented, tested, and are scheduled for deployment.

Prepared by: John Smith Software Development Team Lead