Integrating AI agents in SDL in Nokia SDM

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Abstract: This study introduces an AI-enhanced framework for Nokia's Shared Data Layer (SDL), boosting its ability to handle subscriber data within cloud-native telecom networks. By incorporating AI agents into SDL, the system gains intelligent diagnostics, predictive fault management, autonomous scaling, and proactive service assurance. These improvements are essential as telecom networks advance to accommodate extensive IoT and 5G applications. The suggested model showcases enhanced reliability, scalability, and operational efficiency through the application of real-time telemetry, centralized logging, and intelligent decision-making.

Core Methodologies:

Integrating AI agents into the Nokia SDL using a hybrid methodology that combines Saas and AI-driven intelligent systems can improve the performance, resilience, reliability and scalability of Nokia SDL. Embedding of AI agents into all the components can enhance the cross-component intelligence sharing, automated testing-deployment and revenue optimization analytics by analyzing the components usage metrics. AI agents can be placed throughout the SDL facilitate automatic recovery procedures, defect prediction, anomaly detection, and real-time diagnostics. They can also learn from telemetry and log data to adjust to network activity and ensure fault-free deployment cycles. Machine learning algorithms can be used to identify monetization options and plan proactive maintenance and resource balancing across SDL modules so that it can boost the overall performance of the SDL.

Performance Insights:

Embedding of AI agents into SDL modules enhances system intelligence and economic potential in Saas. They provide high availability and uptime, enhanced fault tolerance, dynamic scalability on demand for the customers, improved operational efficiency in the SDL, and business-centric optimization for the customers. AI-driven customizations and behavioral analytics of the user can lead to higher Average Revenue Per User (ARPU). Additionally, proactively helping customers in service suggestions and predictive churn models for FM increase customer loyalty and satisfaction. These advancements can be achieved through AI agents working in real-time traffic prediction, through regular resource usage diagnostics updates, and proactive service suggestions. *Keywords:* Nokia SDM, Shared Data Layer, AI Agents, Predictive Diagnostics, 5G, IoT, Real-Time Database, Telemetry, Fault Management, Cloud-Native Automation, Saas,O2C.

1. INTRODUCTION

1.1 Background:

Subscriber Data Management (SDM) is vital in managing subscriber information across telecom networks. Nokia's SDL acts as a centralized data repository that supports operational scalability and high-performance access. Integrating AI agents transforms SDL into an adaptive, self-optimizing system. Embedding AI agents into SDL builds an intelligent system where some of the repetitive tasks can be automated as well as defects can be predicted earlier using ML algorithms and provide proactive suggestions and facts on the usage of resources to the customer on hourly basis.

1.2 Objectives:

- Explore the integration of AI agents into SDL for intelligent data handling.
- Understand AI-driven feature development lifecycle in SDL.
- Evaluate the effectiveness of stateless VNFs using AI.
- Align AI-enhanced SDL capabilities with 5G and IoT readiness.

2. REVIEW EXISTING WORK

SDL is the major tool used to centralize the storage for subscriber data. Inclusion to this, while we start the period of 5G as well as IoT, the subscriber idea moves, the devices are connected and enhances the subscribers. Thus, using the items from subscriber data management the app involves unbroken data access and it is specially used while the other cloud service providers save off site data. Thus, the interest is to enable the operators and to centralize the subscriber data by providing space to acknowledge the subscriber task. Subscriber's operations allow the operator to fulfill high individual services like geolocation driven deals and mobile roaming alerts. Basically, these operatives cast the information efficiently utilizing subscriber data management. Since we are entering the IoT age, it is necessary to deploy SDM. Therefore, all the devices are connected like coffee making machines, watches, shoes, refrigerator, electronic machines etc. and massive waves for the subscriber data that contains new links.



Figure 2.1 Components of SDL

3. METHODOLOGY

AI agents enhance digital accessibility and inclusion by providing ubiquitous access to session and subscriber data to the customers, anticipating access problems and immediately fixing the defects, and allocating resources appropriately. They can also identify security threats in SDL analyze the threat and send immediate notifications and troubleshooting guides to the customers. AI facilitates cloud-native system adoption by reducing operational complexity and human error. However, building an AI intelligent system where resources allocations, predictive fault management, real-time analysis threats and immediately troubleshooting the threat and notifying the threats to operator and guiding the operator.



Figure 3.1 Integration of AI agents to SDL

3.1 Analysis and Discussion

Even though integration of AI agents into Nokia's SDL is still in the concept and design stage, preliminary research suggests that there can be significant potential to improve the system intelligence, scalability, resiliency and commercial value. The suggested use of AI for monitoring, diagnostics and revenue optimization is expected to improve service delivery and expedite processes. The discussion also emphasizes anticipated benefits like increased operational agility, personalized user experiences and less manual intervention. Through additional testing and application , these assumptions will be confirmed in real-world scenarios.

4. RESULTS

Integration of AI agents in Nokia's SDL brings up an better feature rollout, increase in efficieny and system resiliency as a whole and improved failover recovery time. Proactive problem solving in concert with ongoing system improvement: Real-time telemetry and diagnostics with AI functionality enabled can help the Saas to predict a good amount of defects earlier. AI-driven techniques can help the models learn the patterns of faults using reinforced ML algorithm in network performance earlier before it is being used by the operators. To conclude these outcomes provides the customer for revenue focused strategies as well as hyper-personalized Saas delivery and a C2C oriented delivery model.

5. CONCLUSION AND FUTURE WORK

5.1. Conclusion:

The intelligence, automation of repetitive tasks, robustness and scalability of Nokia's Shared Data Layer (SDL) can improve the efficiency of software by the incorporation of AI agents. AI turns SDL into a Saas to self-optimized software that is prepared for the needs of 5G and IoT by providing autonomous failover, real-time problem detection, and tailored data-driven services. AI positions SDL as a technological and business asset for telecom carriers by creating new income streams through customer retention, predictive analytics, personalized services and smart service monetization, in addition to operational enhancements

5.2. Future Work:

Using cutting-edge methods like deep learning for better anomaly detection, reinforcement learning for dynamic decision-making, and federated learning to protect data privacy in dispersed contexts end to end in the software can improve the efficiency of the software, future research will concentrate on enhancing the intelligence of AI agents inside SDL with dynamic data. Furthermore, telecom operators can forecast financial KPIs and spot new market trends with the use of a specialized AI-powered revenue optimization module integrated in software. SDL can moreover be flexible for changing 5G and IoT needs.

6 SUMMARY

This study exhibits Shared Data Layer (SDL) can become a highly available, highly flexible, scalable and business-aware platform when AI agents are integrated into it with lot of efficiency and resiliency. SDL can greatly increases network resilience and operational efficiency by integrating AI at the architectural level to provide real-time diagnostics of network usage, autonomous scaling of resources as per user usage requirements, and predictive maintenance for the Saas. Beyond technological improvements, AI-driven analytics open up new income sources by optimizing resource allocation, providing personalized services, and auto-recovery procedures on failures. The end result is building an efficient, resilient, scalable, and a customer personalized SDL by integration AI agents.

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