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Cryptographic Resource Allocation Algorithm Based on Deep Reinforcement Learning

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Abstract : As a key network security method, cryptographic services must fully cope with problems such as the wide variety of cryptographic algorithms, high concurrency requirements, random job crossovers, and instantaneous surges in workloads. Its complexity and dynamics also make it difficult for traditional static security policies to cope with the ever-changing situation. Cyber Threats and Environment. Traditional resource scheduling algorithms are inadequate when facing complex decision-making problems in dynamic environments. A network cryptographic resource allocation algorithm based on reinforcement learning is proposed, aiming to optimize task energy consumption, migration cost, and fitness of differentiated services (including user, data, and task security) by modeling the multi-job collaborative cryptographic service scheduling problem as a multi-objective optimized job flow scheduling problem and using a multi-agent reinforcement learning method, efficient scheduling and optimal configuration of cryptographic service resources are achieved. By introducing reinforcement learning, resource allocation strategies can be adjusted in real-time in a dynamic environment, improving resource utilization and achieving load balancing. Experimental results show that this algorithm has significant advantages in path planning length, system delay and network load balancing and effectively solves the problem of complex resource scheduling in cryptographic services.

Keywords : cloud computing, cryptography on-demand service, reinforcement learning, workflow scheduling
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