

Transaction-based Configuration Management for Mobile Networks

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Abstract:

The assurance of network-wide configuration data consistency in mobile networks is a complex task due to the degree of distribution of the network elements, the properties of the O&M network and the configuration dependencies between the network elements (NEs). To cope with these characteristics, an approach is presented, where configuration changes are communicated as transactions between the NEs and their element management system (EMS). A master-replica paradigm is adopted where the replica (=NE) may autonomously commit configuration data as "tentative" and the master (=EMS) follows the state of the replicas, but may force rollbacks on them. Configuration dependencies between different NEs are expressed as transaction groups. The execution of these groups is controlled by a centralized transaction manager located at the EMS. To provide for a defined duration of the transaction group execution in the presence of transaction failures, either a complete roll-back or a partial commit of the transaction group (thus re-assessing the configuration dependencies) is possible based on operator policy. The presented scheme allows to improve the level of configuration data consistency and the degree of automation in the configuration operations with benefits for both the manufacturer and the Mobile Network Operator. It can be used in parallel to legacy configuration management protocols.