Federated trouble ticket system for service management support in loosely coupled multi-domain environments

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Abstract:
Operating services in multi-domain environments is inherently more complex than in a single domain because of the existence of multiple managed domains with various operating procedures, devices and systems in use. This increased complexity on one side and the demand to provide efficient and reliable services in such environment on the other impose the need to automate service operations processes and procedures. However, in loosely coupled federated service environments where participating domains retain absolute control over internal resources and processes, remotely operated configuration commands, which are prerequisite for automated operations, directly threaten the autonomy of the participating members. In this article, we identify key business processes and required operating support systems components unique to federated environments by analysing process flows for services jointly provided by European National Research and Education Networks. Although we conclude that the involvement of human operators in key service operations processes is inevitable, we propose a new workflow scheme and other necessary components needed to integrate domains in a way that minimizes manual intervention. The proposed scheme interconnects independently operating trouble ticket systems (TTSs) from participating domains in a federated TTS (FTTS). The proposed FTTS is not constrained just to the basic function of TTS—fault management, but it supports all key federated service operation activities like service provisioning, problem or performance management. The proposed fully decentralized federated scheme retains the main inherent capabilities of TTSs such as tracking, escalation and expiration and at the same time supports the desired federated service communication processes.