

# A System for Distributed Enactment of Composite Web Services

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**Abstract.** Availability of a wide variety of Web services over the Internet offers opportunities of providing new services built by composing them out of existing ones. Service composition poses a number of challenges. A composite service can be very complex in structure, containing many temporal and data-flow dependencies between their constituent services. However, constituent service operations must be scheduled to run respecting these dependencies, despite the possibility of intervening processor and network failures. The architecture must be scalable, providing a decentralised coordination of service execution rather than based on a centralised scheduler; this is particularly important for services spanning different organisations, where reliance on centralised coordination would be impractical. This paper presents the design and implementation of DECS: a workflow management system for Distributed Enactment of Composite Services. A novel feature of DECS is the separation between specification of service composition and its enactment. A DECS service specification can be deployed either for centralised or decentralised coordination, depending upon inter-organisational requirements. A prototype implementation of DECS has been performed using J2EE middleware. The paper describes the DECS task model for specifying service composition and the middleware services that have been implemented in J2EE for coordinating service execution.