# Motivation

Pervasive distributed systems often consist of many networked systems that are highly heterogeneous with respect to hardware, software and networks. These networked systems communicate via a plethora of disparate protocols leading to data and behavior incompatibilities. Solutions that dynamically reveal and fix interoperability issues are required to solve the mismatches that arise among the different running systems.
Interoperability can be considered from many perspectives and at different levels, from the application down to the network layer. Part of the focus should be on the middleware-layer since it stands as a conceptual paradigm to effectively connect heterogeneous systems. Moreover, application designers often choose a middleware first (based on the services provided), which may have an influence over the application since it implies the use of particular programming model.

Interoperable middleware has been introduced to overcome middleware heterogeneity. However, solutions remain rather static, requiring either the use of a proprietary interface or a priori implementation of protocol translators. In general, interoperability solutions solve protocol mismatches from application-layer down to middleware-layer at the syntactic level, which is too restrictive. This is particularly true when one considers the many dimensions of heterogeneity that arise in ubiquitous networking environments and require fine tuning of the middleware according to the specific capacities of the interacting parties. Thus, interoperable middleware can at best solve protocol mismatches that occur among domain-specific middleware. It is simply not possible to design beforehand a universal middleware solution that will enable effective networking of digital systems, while spanning the many dimensions of heterogeneity that currently exist in networked environments or which are likely to exist in the future.

Research

A revolutionary approach for the seamless networking of digital systems is to dynamically synthesize the connectors that make the networked systems able to communicate. This way neither the application nor the middleware itself need to be changed. And, since interactions in pervasive environments are generally spontaneous and dynamic, this adaptation should be fully automated.
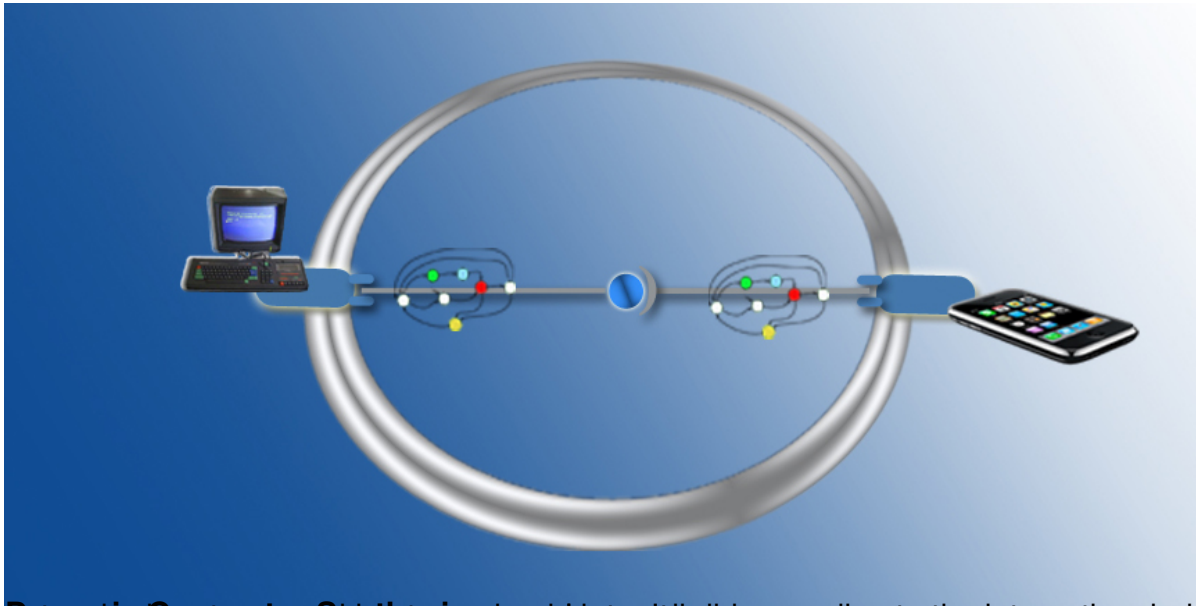
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Supporting Grant

- [Connect](#) -- IST   FP7 FET IP - Emergent Connectors for Eternal Software Intensive Networked Systems

Related Software

- [Connect Discovery Enabler](#)
- [MICS: Mediator synthesIs to CONNECT componentS](#)

[Presentations (registered users only)](#)
Publications