

# Communication, IP-Enabled Devices and a Loosely-Coupled Distributed Computing Environment for Spatial and Transportation Applications

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Recent advances in communications infrastructures, software and embedded systems technologies have encouraged research towards the development of novel computing platforms through the coupling of discrete (often embedded) components with service-oriented functionality. Such environments can potentially provide transparent, 'added value' user interaction based on environmental and contextual requirements, in transportation the desire to achieve an optimal operating environment against a constraint of competitive and low cost market entrants.

While the emergence of these technologies owes much to conventional distributed computing concepts, the development of vehicle specific target applications relies as much upon defining paradigms of communication protocol as conventional architectural data.

This paper illustrates some of the practical issues concerning the development of a spatially referenced transportation application. It outlines issues encountered in establishing mobile communication, the provision of adequate programming abstractions for modelling 'IP-enabled' devices, highlighting similarities with the emergent 'grid' computing paradigm. Emphasis is placed on context modelling and real time data capture for analysis and intelligent utilisation within a transportation architecture specific to communications in the public transit environment.

**Key Words:** Communication Paradigm, Pervasive Computing, Distributed Computing, Intelligent Agent Technologies, Device Autonomy, Transportation and Artificial Intelligence.

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