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Optimized Service Embedding for Smart Buildings: Balancing Energy and Delay

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Abstract: *This paper presents a generic Mixed Integer Linear Programming (MILP) model designed to minimize overall power consumption arising from both processing operations and network traffic flow. The model is applied within a smart building context to explore energy-efficient and latency-aware deployment of IoT resources. The core problem involves identifying the optimal configuration of IoT nodes and communication links for embedding Business Processes (BPs) within the IoT infrastructure. Three distinct objective functions are considered: (1) minimizing processing and network power consumption, (2) minimizing average traffic latency, and (3) minimizing a weighted combination of power consumption and latency. The MILP formulation provides a structured approach to achieving optimal resource allocation while balancing performance and energy efficiency in smart IoT environments.*

Keywords: Mixed Integer Liner Programming(MILP), energy-efficient and latency