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Abstract: Every-day devices are being miniaturized, equipped with transducers and transformed into internet-connected sensor nodes. Above smart-devices, not only can sense their surroundings, but could also store and disseminate their observations. While Internet of the Things (IoT) introduces a new, dynamic, participatory ecosystem of decentralized and collaborative devices, intrinsic heterogeneity hinders its full realization. Diversity of smart-devices and their resulting data formats, demands for interoperable data curation solutions. Open Geospatial Consortium (OGC) has put significant work towards interoperable data interchange. Through Sensor Web Enablement (SWE) and its related service interfaces, and information models, OGC offers syntactic and semantic interoperability. Sensor Observation Service (SOS), is a well-established, pull-based service interface. Through its web service specification, clients are provided with interoperable means for accessing sensor observations. In this work, we investigate the SOS suitability to operate in an environment of restrained-capabilities' devices (in terms of bandwidth and processing power). We argue, that current SOS design ill performs in specific temporal and/or spatial requests, and we present a new one. Suggested design was motivated by IoT features (i.e. limited-capabilities devices and opportunistic internet connection), and drafted so as to have a non-invasive nature (e.g. a SOS server, implementing our design can be reached in most cases, by current SOS clients). Our proposed SOS design is based on progressive data transmission, facilitates selective data retrieval, and adds a disruption/fault-tolerant attribute to the standard itself, while ensuring the "no a-priori knowledge" SOS specification. Finally, implementing both designs, current and proposed, incorporating them into SOS servers, and evaluating them against two case-studies, we demonstrate that our design leads to high-performance in some cases (e.g. irregular timeseries), while adds only a little overhead in all others.

Keywords*:* Sensor Observation Service; Internet of Things; syntactic interoperability; SOS 2.0.0