EVALUATION OF EFFICIENT XML INTERCHANGE (EXI) FOR LARGE DATASETS AND AS AN ALTERNATIVE TO BINARY JSON ENCODINGS

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Bruce Hill, Lieutenant, United States Navy


Abstract. Current and emerging Navy information concepts, including network-centric warfare and Navy Tactical Cloud, presume high network throughput and interoperability. The Extensible Markup Language (XML) addresses the latter requirement, but its verbosity is problematic for afloat networks. JavaScript Object Notation (JSON) is an alternative to XML common in web applications and some non-relational databases. Compact, binary encodings exist for both formats. Efficient XML Interchange (EXI) is a standardized, binary encoding of XML. Binary JSON (BSON) and Compact Binary Object Representation (CBOR) are JSON-compatible encodings. This work evaluates EXI compaction against both encodings, and extends evaluations of EXI for datasets up to 4 gigabytes. Generally, a configuration of EXI exists that produces a more compact encoding than BSON or CBOR. Tests show EXI compacts structured, non-multimedia data in Microsoft Office files better than the default format. The Navy needs to immediately consider EXI for use in web, sensor, and office document applications to improve throughput over constrained networks. A suite of test examples and an evaluation framework also need to be developed to support this process.

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Keywords: Extensible Markup Language (XML), Efficient XML Interchange (EXI), JavaScript Object Notation (JSON), Compact Binary Object Representation (CBOR), Binary JSON (BSON), data serialization, data interoperability.

Links: catalog, slideset (.pdf), thesis.