XML Analysis Template

15 January, 2015

Results for Digital Forensics XML (DFXML) Use Case

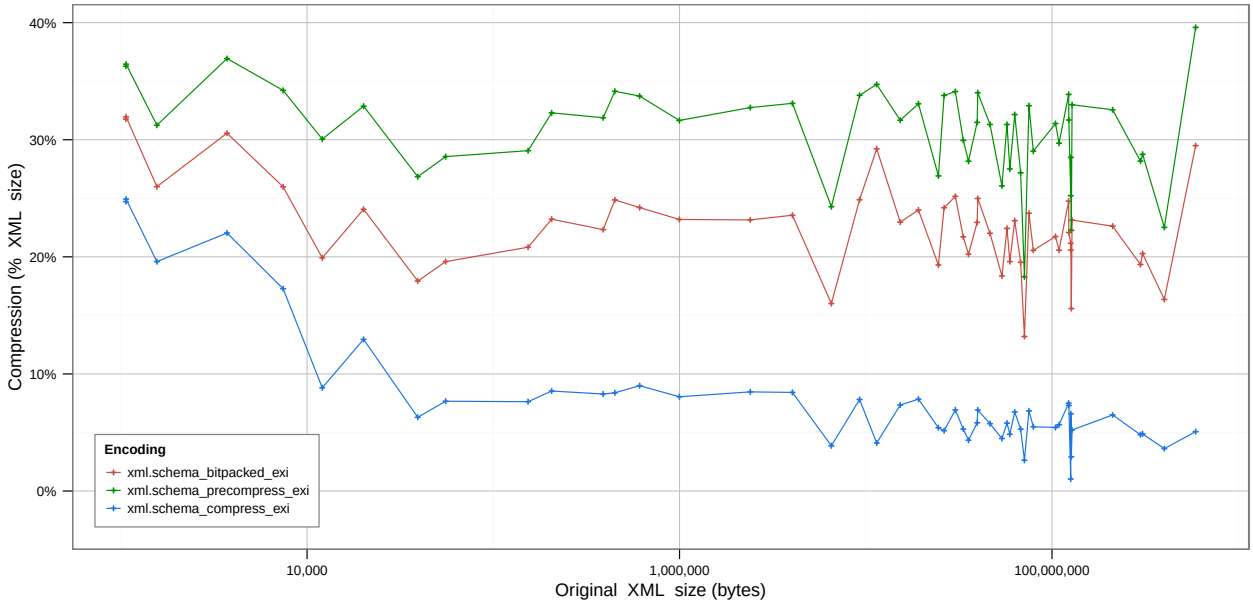
EXI Exploratory

A. How do the primary EXI modes compare for schemaless encodings?

```
## [1] "Series:   xml.bitpacked_exi, xml.precompress_exi, xml.compress_exi"
## [1] "Baseline:  xml"
##  xml.bitpacked_exi xml.precompress_exi xml.compress_exi
##  Min.   :0.1672    Min.   :0.2253      Min.   :0.01051
##  1st Qu.:0.2359    1st Qu.:0.3158      1st Qu.:0.05597
##  Median :0.2627    Median :0.3471      Median :0.07387
##  Mean   :0.2802    Mean   :0.3592      Mean   :0.10029
##  3rd Qu.:0.2823    3rd Qu.:0.3641      3rd Qu.:0.09087
##  Max.   :0.6214    Max.   :0.6917      Max.   :0.45019
```

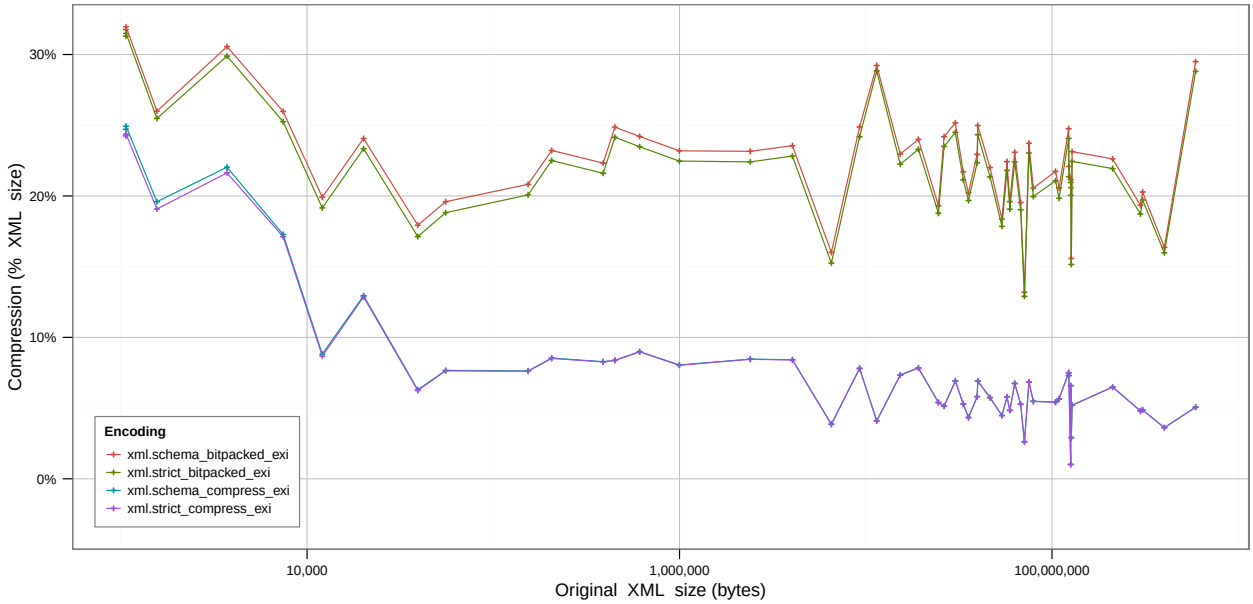
B. How do the primary EXI 'modes' compare for schema-informed encodings?

```
## [1] "Series:   xml.schema_bitpacked_exi, xml.schema_precompress_exi, xml.schema_compress_exi"
## [1] "Baseline:  xml"
##  xml.schema_bitpacked_exi xml.schema_precompress_exi
##  Min.   :0.1319           Min.   :0.1829
##  1st Qu.:0.2025           1st Qu.:0.2853
##  Median :0.2262           Median :0.3165
##  Mean   :0.2253           Mean   :0.3081
##  3rd Qu.:0.2420           3rd Qu.:0.3342
##  Max.   :0.3196           Max.   :0.3960
##  xml.schema_compress_exi
##  Min.   :0.01020
##  1st Qu.:0.05180
##  Median :0.06593
##  Mean   :0.07769
##  3rd Qu.:0.08165
##  Max.   :0.24930
```



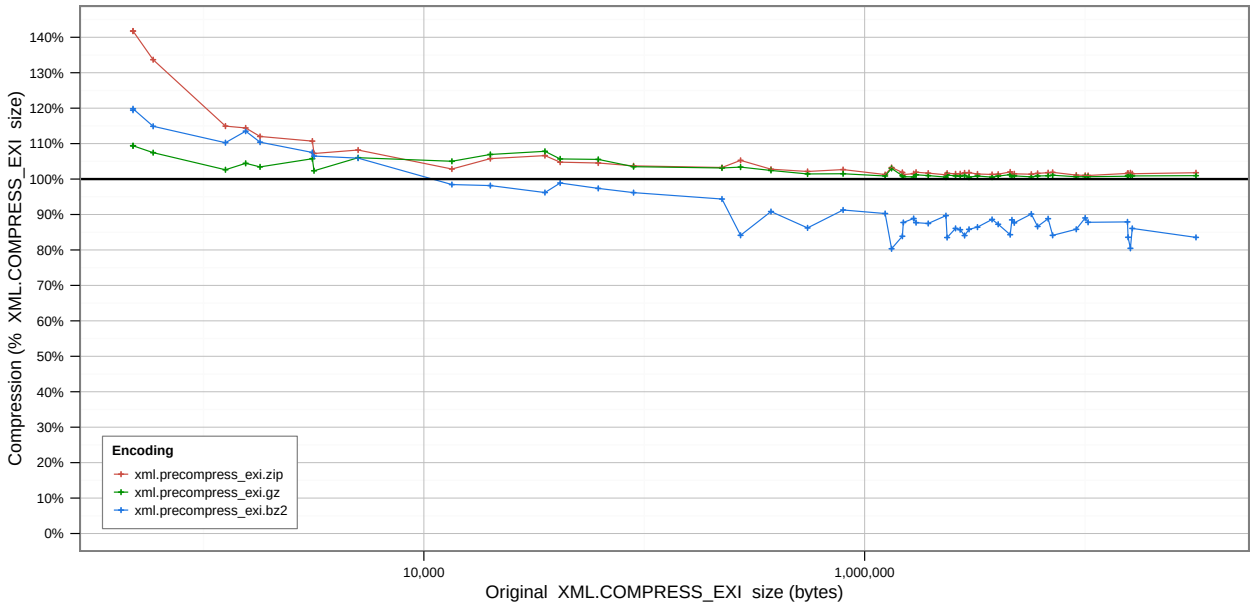
C. Does the 'strict' option significantly improve compaction for schema-informed encodings?

```
## [1] "Series:   xml.schema_bitpacked_exi, xml.strict_bitpacked_exi, xml.schema_compress_exi, xml.stric
## [1] "Baseline:  xml"
##  xml.schema_bitpacked_exi xml.strict_bitpacked_exi xml.schema_compress_exi
##  Min.   :0.1319           Min.   :0.1290           Min.   :0.01020
##  1st Qu.:0.2025           1st Qu.:0.1970           1st Qu.:0.05180
##  Median :0.2262           Median :0.2193           Median :0.06593
##  Mean   :0.2253           Mean   :0.2190           Mean   :0.07769
##  3rd Qu.:0.2420           3rd Qu.:0.2349           3rd Qu.:0.08165
##  Max.   :0.3196           Max.   :0.3149           Max.   :0.24930
##  xml.strict_compress_exi
##  Min.   :0.01017
##  1st Qu.:0.05160
##  Median :0.06580
##  Mean   :0.07709
##  3rd Qu.:0.08145
##  Max.   :0.24367
```



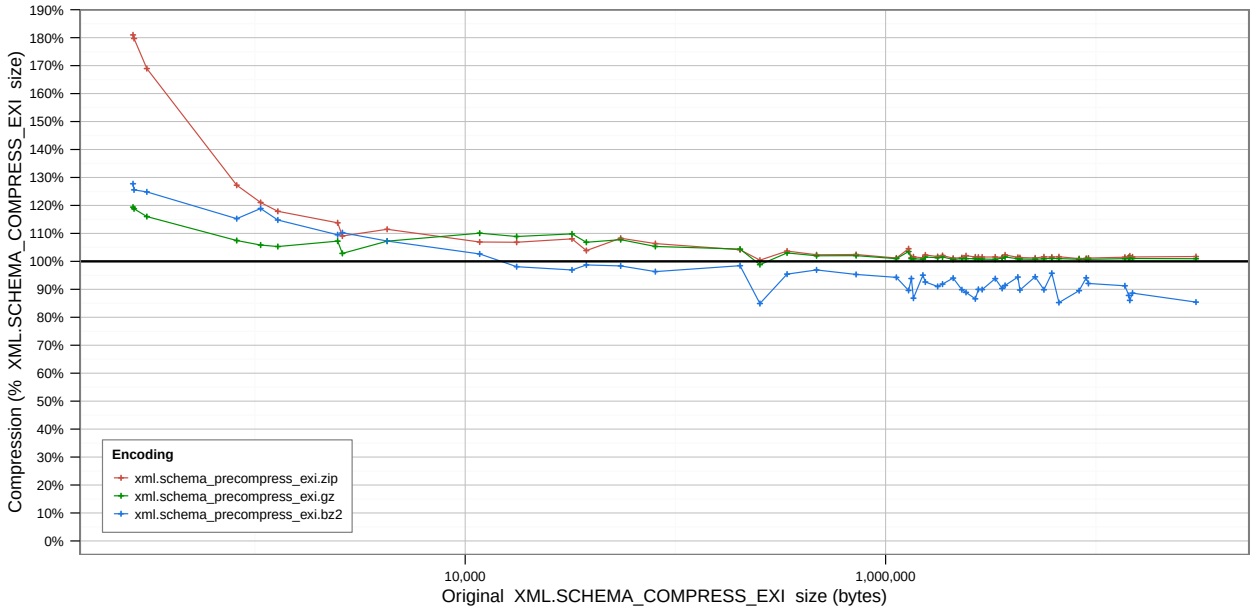
D. Do any of the tested compression algorithms perform better on a schemaless, precompress EXI document than the standard DEFLATE?

```
## [1] "Series:   xml.precompress_exi.zip, xml.precompress_exi.gz, xml.precompress_exi.bz2"
## [1] "Baseline:  xml.compress_exi"
##  xml.precompress_exi.zip xml.precompress_exi.gz xml.precompress_exi.bz2
##  Min.   :1.010           Min.   :1.005          Min.   :0.8033
##  1st Qu.:1.015           1st Qu.:1.008          1st Qu.:0.8595
##  Median :1.018           Median :1.010          Median :0.8848
##  Mean   :1.055           Mean   :1.025          Mean   :0.9251
##  3rd Qu.:1.046           3rd Qu.:1.034          3rd Qu.:0.9678
##  Max.   :1.418           Max.   :1.094          Max.   :1.1983
```



E. Do any of the tested compression algorithms perform better on a schema-informed, precompress EXI document than the standard DEFLATE?

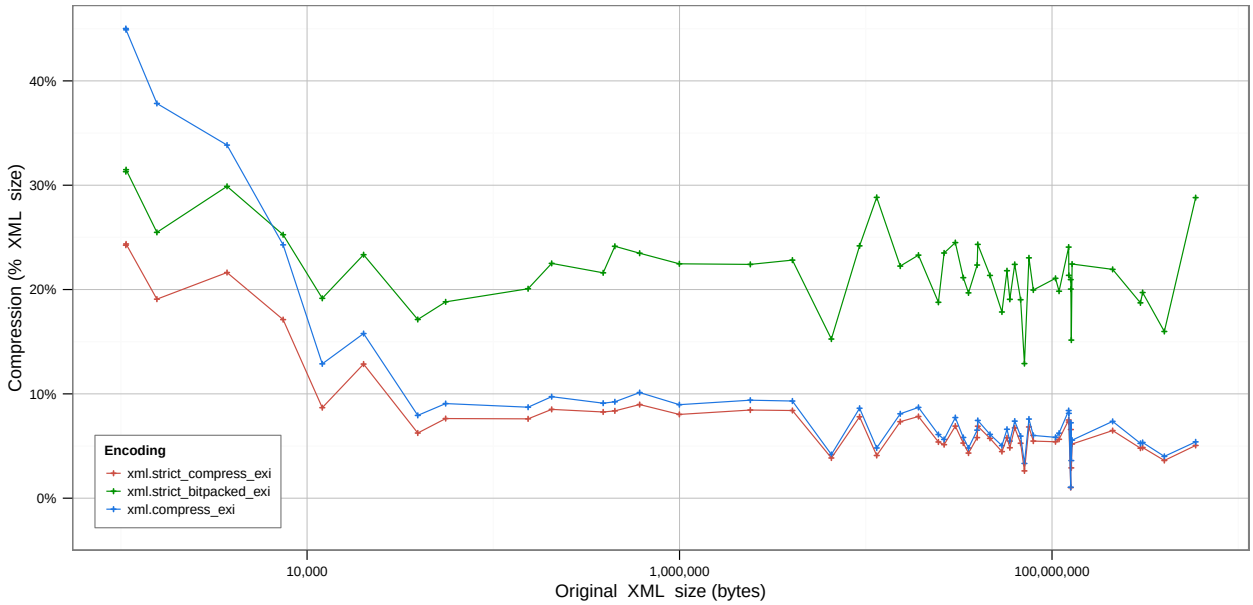
```
## [1] "Series:   xml.schema_precompress_exi.zip, xml.schema_precompress_exi.gz, xml.schema_precompress
## [1] "Baseline:  xml.schema_compress_exi"
##  xml.schema_precompress_exi.zip xml.schema_precompress_exi.gz
##  Min.   :1.004                  Min.   :0.9882
##  1st Qu.:1.015                  1st Qu.:1.0093
##  Median :1.017                  Median :1.0116
##  Mean   :1.085                  Mean   :1.0357
##  3rd Qu.:1.066                  3rd Qu.:1.0531
##  Max.   :1.810                  Max.   :1.1939
##  xml.schema_precompress_exi.bz2
##  Min.   :0.8491
##  1st Qu.:0.8985
##  Median :0.9402
##  Mean   :0.9667
##  3rd Qu.:0.9823
##  Max.   :1.2776
```



Binary-comparisons

F. Which EXI encoding is the most compact?

```
## [1] "Series:   xml.strict_compress_exi, xml.strict_bitpacked_exi, xml.compress_exi"
## [1] "Baseline:  xml"
##  xml.strict_compress_exi xml.strict_bitpacked_exi xml.compress_exi
##  Min.   :0.01017         Min.   :0.1290           Min.   :0.01051
##  1st Qu.:0.05160         1st Qu.:0.1970           1st Qu.:0.05597
##  Median :0.06580         Median :0.2193           Median :0.07387
##  Mean   :0.07709         Mean   :0.2190           Mean   :0.10029
##  3rd Qu.:0.08145         3rd Qu.:0.2349           3rd Qu.:0.09087
##  Max.   :0.24367         Max.   :0.3149           Max.   :0.45019
```



G. For a network already using gzip, do any of the EXI encodings offer improvements?

```
## [1] "Series:   xml.strict_compress_exi, xml.strict_bitpacked_exi, xml.compress_exi"
## [1] "Baseline:  xml.gz"
##  xml.strict_compress_exi xml.strict_bitpacked_exi xml.compress_exi
##  Min.   :0.05878         Min.   :0.5915           Min.   :0.06076
##  1st Qu.:0.50601         1st Qu.:1.7494           1st Qu.:0.61169
##  Median :0.59030         Median :1.9474           Median :0.66058
##  Mean   :0.56827         Mean   :1.8637           Mean   :0.67228
##  3rd Qu.:0.65522         3rd Qu.:2.1301           3rd Qu.:0.78448
##  Max.   :0.72478         Max.   :3.4527           Max.   :0.95303
```