

#### Format:

- Variable frequencies permitted
- Any time series data can be encoded (e.g. transforms of original data)

#### Compression:

- Decreased data storage
- Increased network transfer speeds
- Variable compression block size permitted
- Separate sampling rates for each channel can reduce data volume

#### RED encoding:

- Lossless
- Improved compression ratio with decreased signal variance (e.g. filtering)
- parallelizable algorithms

#### Encryption:

- AES 128-bit
- HIPAA compliant
- Sharing of human data does not require de-identification procedures
- Dual-tiered encryption scheme allowing differential access to same file:
  - Unauthorized copies have no access to critical recording details (e.g. sampling frequency) or data
  - Authorized copies can reveal either just recording details or subject data and recording details
  - Encryption is not required

#### Access:

- Rapid random access via block indices section
- Reading / writing algorithm memory allocation facilitated by block byte & sample max header fields
- Block and header field alignment facilitates direct variable access after data read

#### Analysis:

- Separate file for each channel to facilitate parallel processing
- Independence of blocks support asynchronous and parallel processing
- Increased read/write speeds due to compression
- Precalculated file and block min/max to facilitate various analyses (e.g. display)

#### Redundancy / Damage mitigation:

- 32-bit CRC checksum for block corruption
- Block independence limits extent of data loss if damage occurs
- 8-byte block alignment can facilitate file recovery in alignment loss
- Block time duplicated in block header and block indices section
- Entire block indices section can be reconstructed from data section

Time:

- Discontinuity flag

- uUTC time provides globally accurate date & time of day to microsecond resolution

- uUTC time is easily converted to UTC time for use with standard Unix / Posix time functions

Events:

- Stored in XML format to facilitate parsing, display, and import to databases

- Novel event types readily accommodated by XML

Support:

- Open source (Gnu software license)

- Freely available C, Matlab, & Java functions