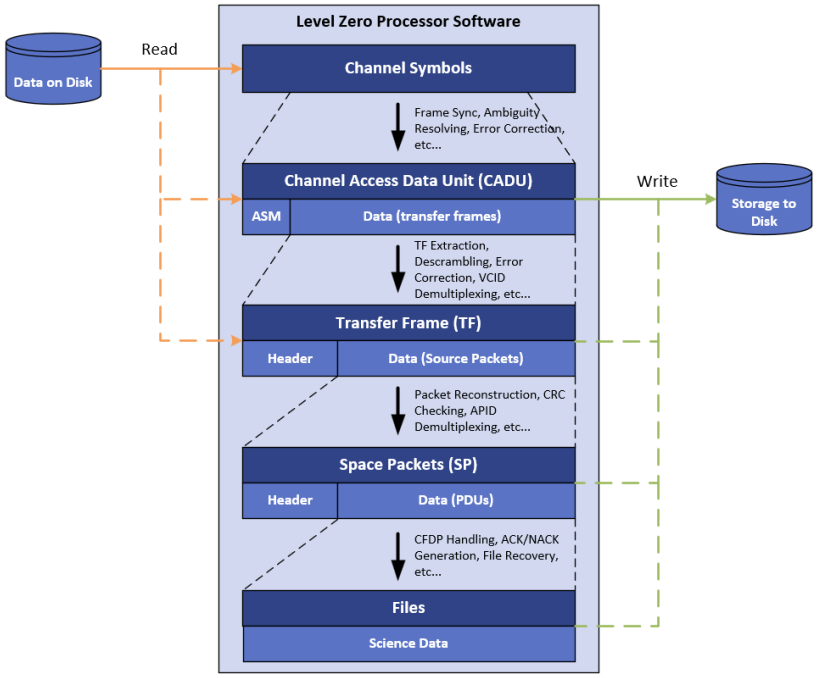
CELESTIA | C-STS

Level Zero Processor Software

SOURCE AGNOSTIC SATELLITE DATA PROCESSOR

The Level Zero Processor Software (LZP) provides all level-0 processing functions required to extract telemetry (TM) frames, packets and files (science data) from RAW binary acquired data streams stored on disk. Most commonly the data is received via a satellite RF, Optical or Bypass links during AIT or Operational phases.



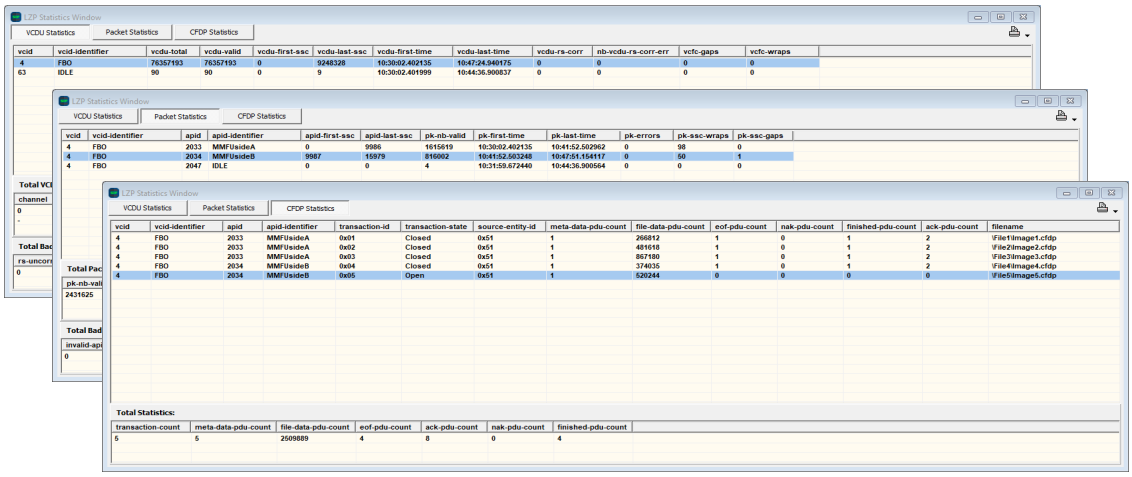
KEY FEATURES:

- Ingestion of data directly from the local storage or shared (SAMBA/CIFS/NFS) network drives
- RAW Binary or C-STS Archive input as recorded from C-STS products (e.g. WizardLink, Parallel LVDS)
- Processing of TM data from RAW bitstream to frame, packet and file level
- Frame Synchronization and Ambiguity Resolving (BPSK, QPSK, 8PSK)
- Arbitrary length CADUs (length in bits) – incl. recorder meta-data skipping
- Convolutional Decoding (1/2 rate)
- Derandomisation (CCSDS/ECSS)
- RS detection/correction (223/239, IL1-8 with Virtual Fill)
- AES256/128 Decryption (standard supported modes are OFB, CTR, CCM and GCM)
- Interface (network) to external deciphering units at frame level
- Frame Checking, VC Demultiplexing and Filtering
- Space Packet Reconstruction and Checking, APID Demultiplexing and Filtering
- CFDP Class 1 (unacknowledged) and Class 2 (acknowledged) Processing
- Processing of data based on Satellite Configuration files
- Task based processing allowing batch processing
- Real-time statistical analysis, error checking and reporting on Frame, Packet and CFDP PDU level
- Storage of output data from different processing stages (Frame, Packet and File level)
- Reporting of all processing results in XML file
- Live processing statistical GUI at all processing stages (Frame, Packet and File level)
- Processing performance up to 2Gbps (125MByte/s)

LEVEL ZERO PROCESSOR SOFTWARE

The LZP is comprised of a powerful software framework of processes that can operate in parallel to achieve high bitrate throughputs. The LZP operates on a so-called “task” basis, which allows for flexible use of the Level Zero Processor in local mode or a batch-processing mode in which multiple data jobs can be scheduled and automatically processed. The LZP is a data-driven system that implements data processing (CADU/SP/File levels), checking, statistical presentation and reporting based on input data files, which in the architecture of the system can be read directly from a local or remote shared (CIFS or NFS) drives.

The output can be on multiple levels (Frame, Packet and File) and is nominally sorted and stored to local disk. In case the data is encrypted the LZP supports an interface ‘hook’ to connect local customer furnished software or an external system (using Ethernet) to decrypt/decipher the data, either on frame or packet level. Standard deciphering libraries are also supported with the Level Zero Processor, such as AES-256/128.



STANDARDS / RECCOMENDATIONS

The Level Zero Processing software is in accordance with the following standards/recommendations:

- Telemetry Synchronization and Channel Coding, ECSS-E-50-01C
- TM Synchronisation and Channel Coding, CCSDS-131.0
- TM Space Data Link Protocol, CCSDS-132.0
- Space Packet Protocol, CCSDS-133.0
- AOS Space Data Link Protocol, CCSDS-732.0
- CCSDS File Delivery Protocol, CCSDS 727.0
- Advanced Encryption Standard (AES), FIPS PUB 197
- Block Cipher Modes of Operation, 800-38A
- CCSDS File Delivery Protocol, CCSDS 727.0-B5

MINIMUM WORKSTATION REQUIREMENTS

Processor	CPU with at least 4 cores and 2.1GHz, x64
Memory	32GByte
Hard Disk (LZP Software)	150MByte
Hard Disk (Output Data Storage)	1TByte (SSD recommended)
Operating System	Windows 10 Professional or higher (64-bit)