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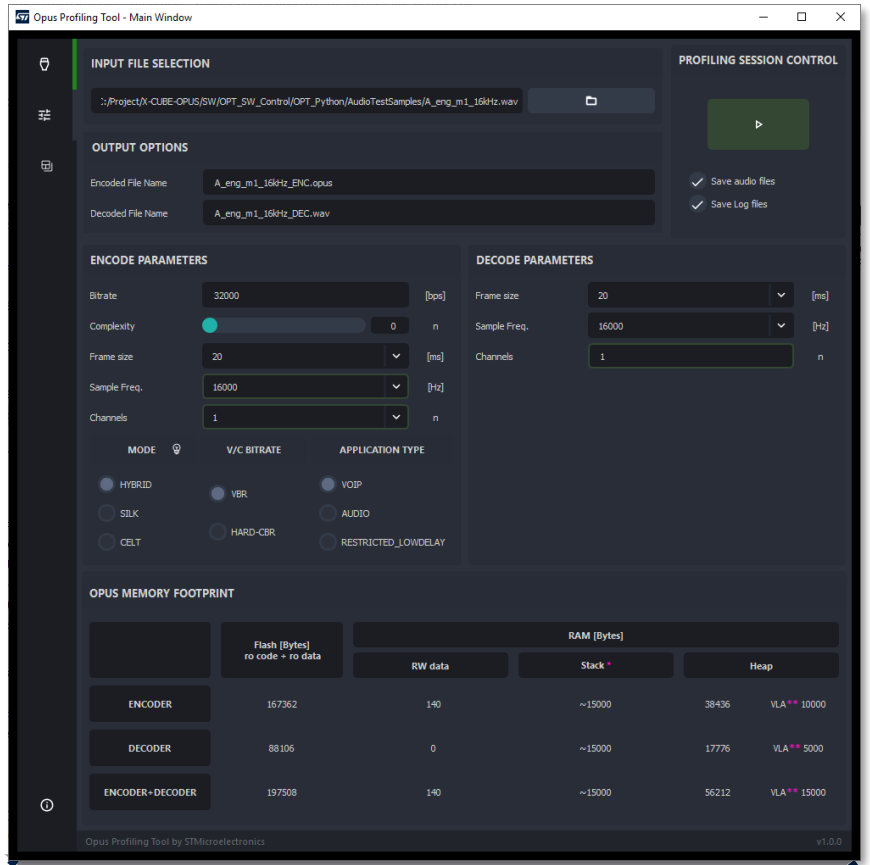
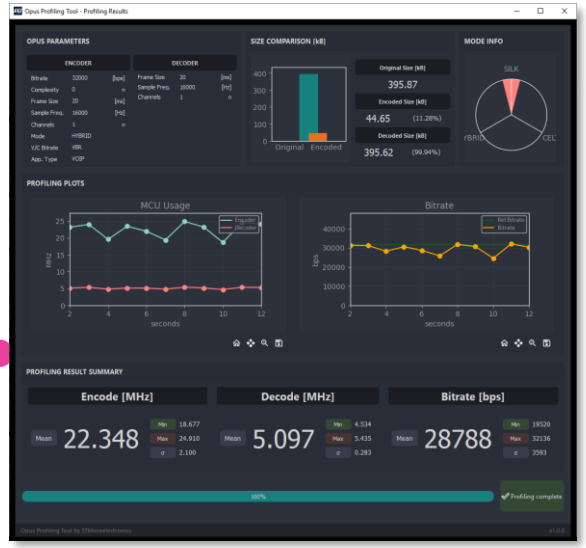
OPT SW Control

Quick start guide

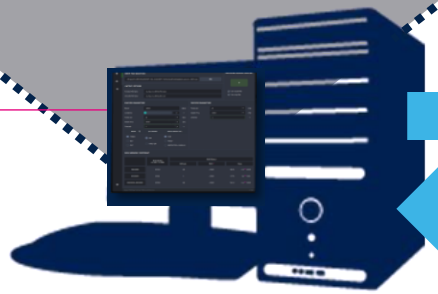
Opus Profiling Tool



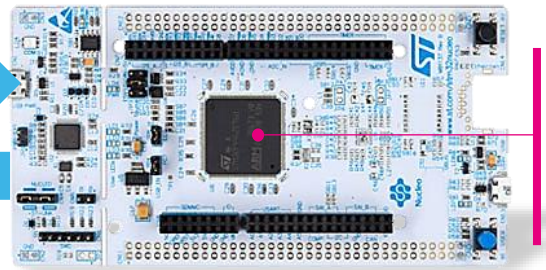
- Opus Profiling on STM32
- Highly customizable Input
  - Opus Encode and Decode parameters
- Interactive result plot
  - MHz Bitrate and Output files size
- Profiling result summary
  - Min, max, avg and std. dev
- Encoded and Decoded Output files
- Data log in .csv file



Interactive dashboard



Serial Protocol



STM32H743ZI-Nucleo
STM32F746ZG-Nucleo
STM32F413ZH-Nucleo
P-NUCLEO-WB55.Nucleo
NUCLEO-L552ZE-Q

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Audio test samples

The **OPT package** includes a set of audio test samples that can be used to evaluate the profiling tool.
The AudioTestSamples folder contains:

A_eng_m1.wav	Speech samples: American English, voice 16kHz, mono, 16 bit/sample Test Vectors Associated to Rec. ITU-T P.50 Appendix I source : https://www.itu.int/net/itu-t/sigdb/genaudio/AudioForm-g.aspx?val=1000050
music_origin.wav	music sample: 48 kHz, stereo, 16 bit/sample source: https://opus-codec.org/examples/ the track has been cut
speech_orig.wav	speech sample: 48 kHz, mono, 16 bit/sample source: https://opus-codec.org/examples/

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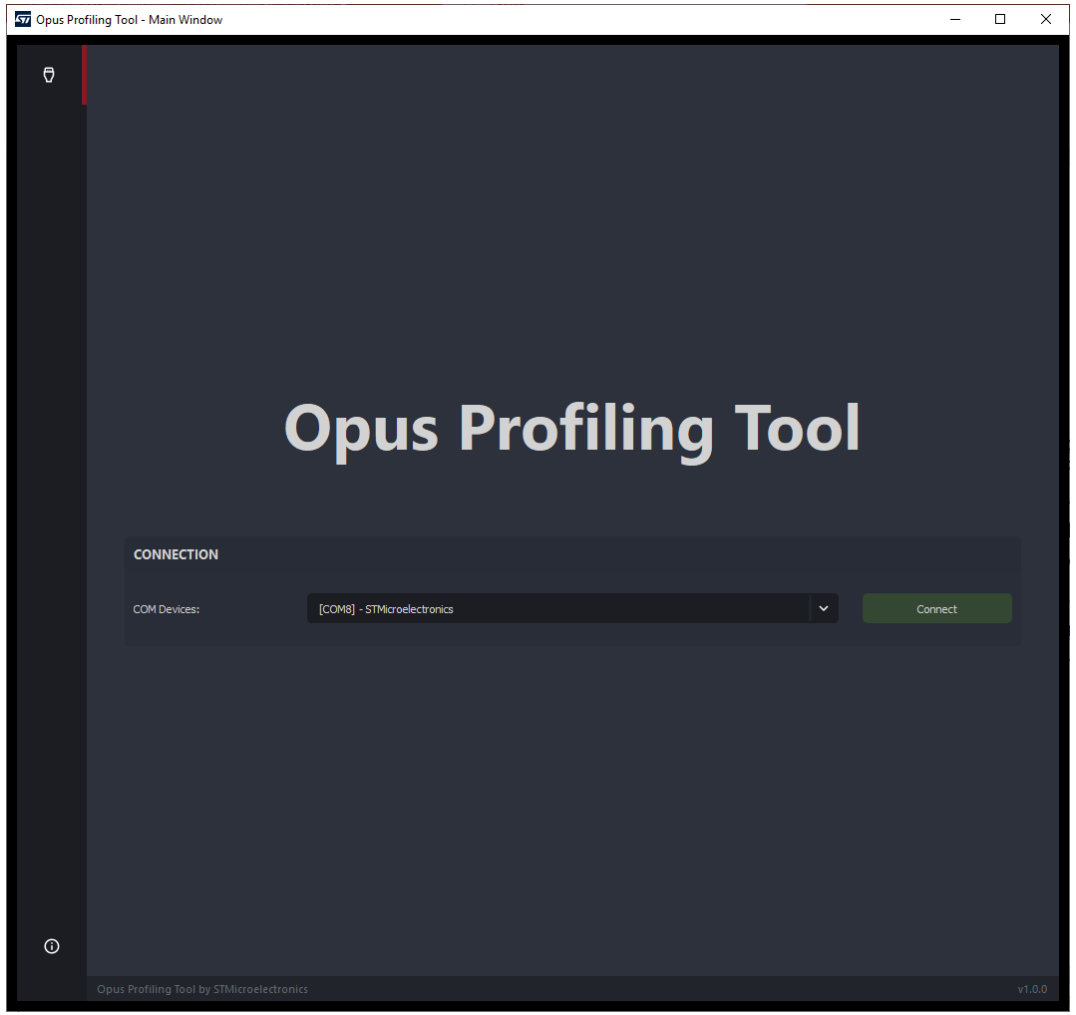
Connection



1. Flash a supported STM32Nucleo board with OPT FW.
2. Select the right COM port from the list, only ST board will be displayed.
3. Open the COM port by clicking on the relevant button.
4. The GUI automatically switch to the profiling page.

Input / Output file

Select an audio file for profiling test.
Supported format: wav, mp3, raw

If the selected input file is correct the button become green and the profiling can be started

Encoded raw data

Output result after encode and decode

Save audio files (encoded and decoded) and/or Log file.
Output file will be saved in a dedicated folder created in the same path of the input file

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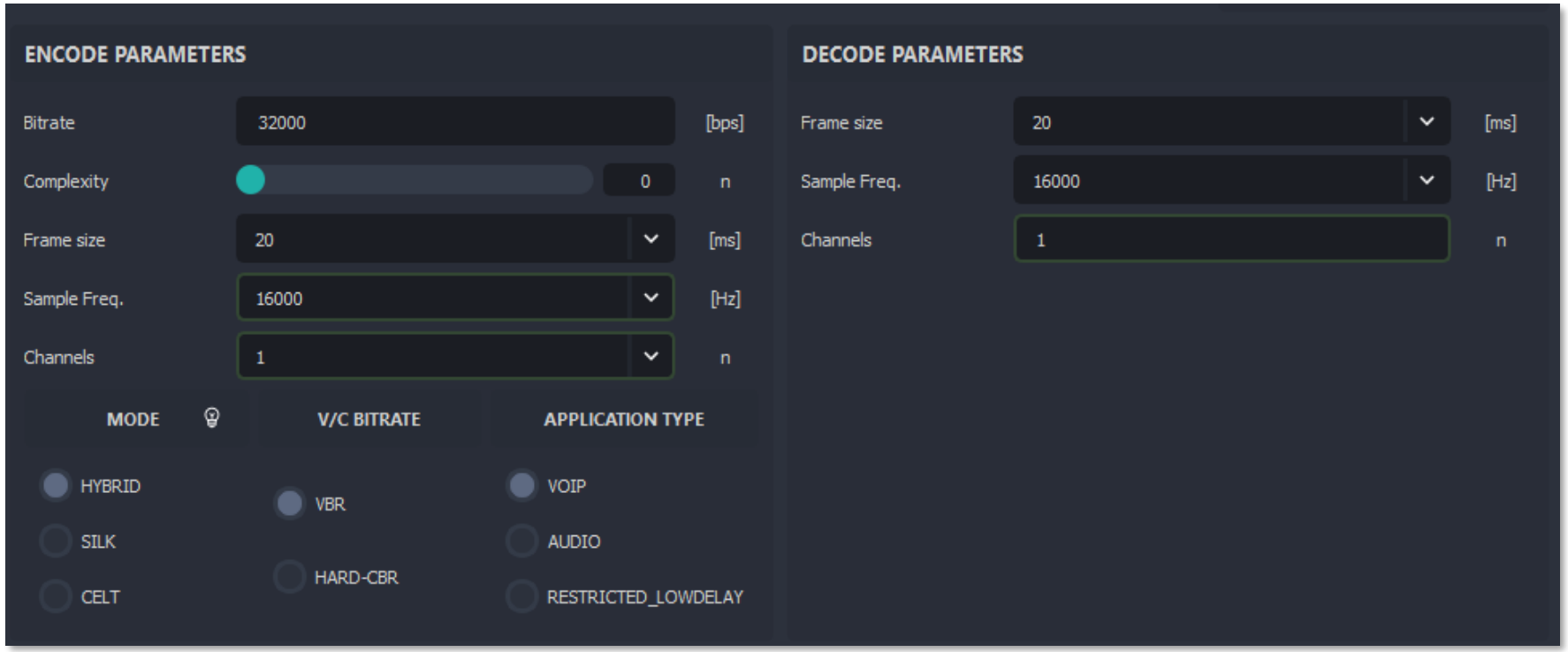
Encoder and Decoder parameters



Choose desidered encoder and decoder parameters. For detailed description please refer to X-CUBE-OPUS User Manual

if a non-raw input file is chosen, sampling frequency and number of channels are automatically selected since that two parameters are extracted directly from the audio file header.

The frame size for encoder and decoder must be the same.

Depending on the chosen configuration you can see the radio button lock on a specific mode or Opus can decide to switch between one algorithm to another during the profiling

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Opus memory footprint

It shows an estimation of the Flash and RAM used by the MCU. It's divided in Encoder, Decoder and Encoder+Decoder if you use both.

Memory allocated during encoder and decoder initialization vary depending on:
Stereo input | Mono input

OPUS MEMORY FOOTPRINT

	Flash [Bytes] ro code + ro data	RAM [Bytes]			
		RW data	Stack *	Heap	
ENCODER	167362	140	~15000	43180	38436	VLA** 10000
DECODER	88106	0	~15000	26496	17776	VLA** 5000
ENCODER+DECODER	197508	140	~15000	69676	56212	VLA** 15000

This value is just an estimation measured at runtime.
It can vary depending on the chosen Opus configuration.

Profiling results

Opus parameters summary

Comparison between original input file size and encoded file

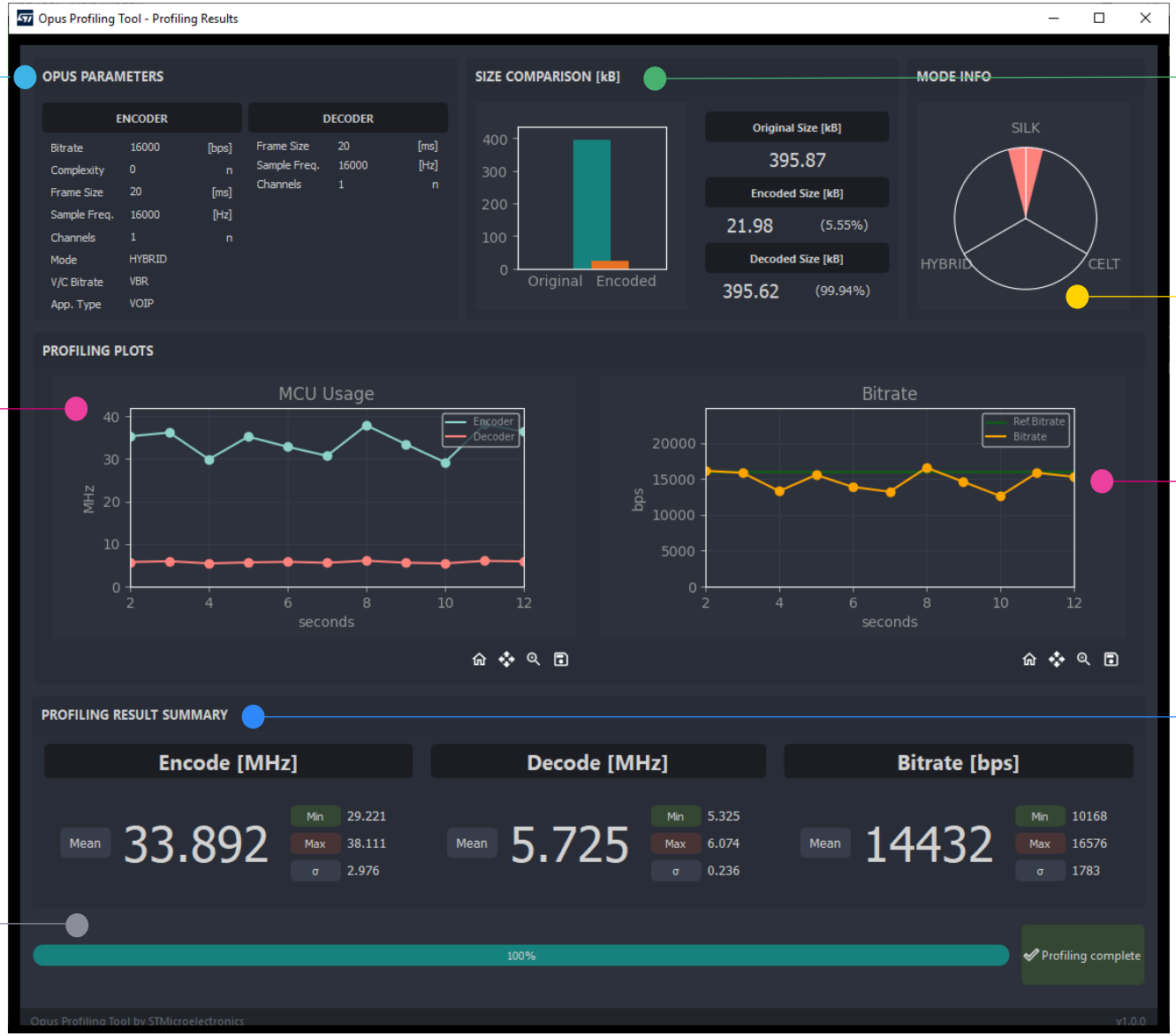
Opus algorithm used frame by frame: CELT, SILK or Hybrid

MHz requested to perform 1 sec of encode and decode

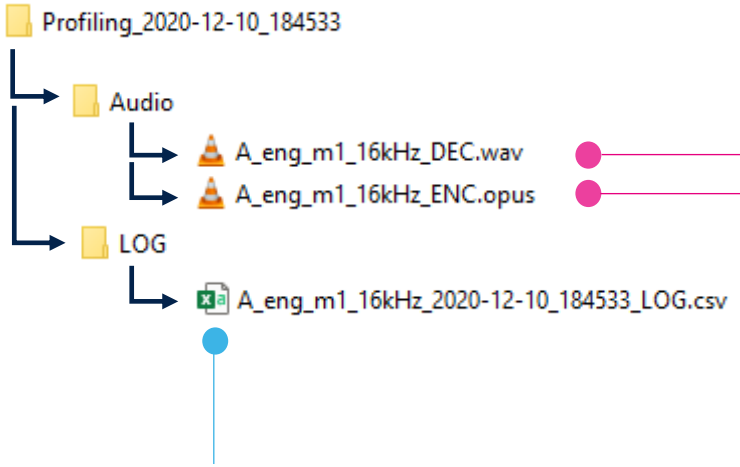
Actual bitrate

Profiling result summary: average, standard deviation, maximum and minimum value for Encode, Decode and Bitrate

Progress bar



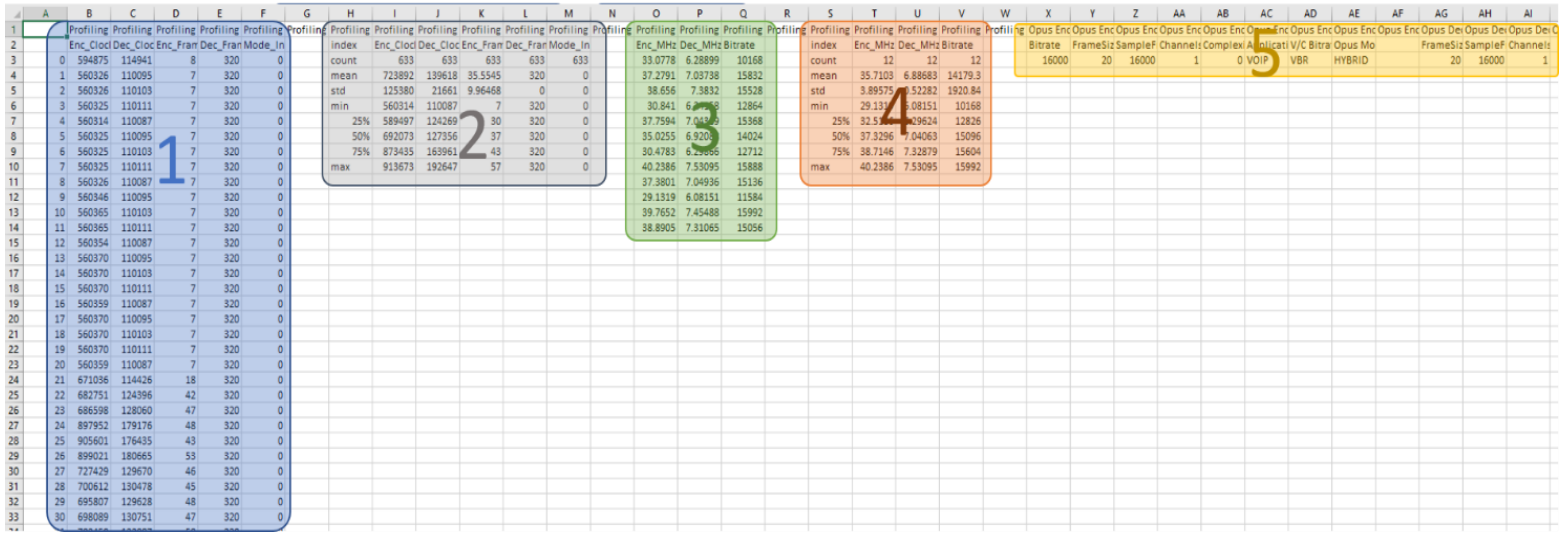
Profiling output file



Audio file obtained after Opus encoding and decoding

Audio input file encoded

1. Profiling data for each audio frame
2. Statistics related to the frame-by-frame profiling in section 1
3. Encoder and decoder MCU usage and bitrate for each second of audio analyzed
4. Statistics related to profiling data for each second in section 3
5. Summary of Opus settings chosen for the current profiling



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