EPICS Module for Beckhoff ADS Protocol

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Who am I?

- Working with Cosylab for a couple of years now

- Collaborating on EPICS and Beckhoff projects

- I've been tasked with porting our original ADS device support to Autoparam

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What is ADS?

- TCP based communication protocol developed by Beckhoff

- Devices communicate via message router

- Used internally in a TwinCAT system (e.g., HMI)

- Libraries for external clients

- Not to be confused with EtherCAT

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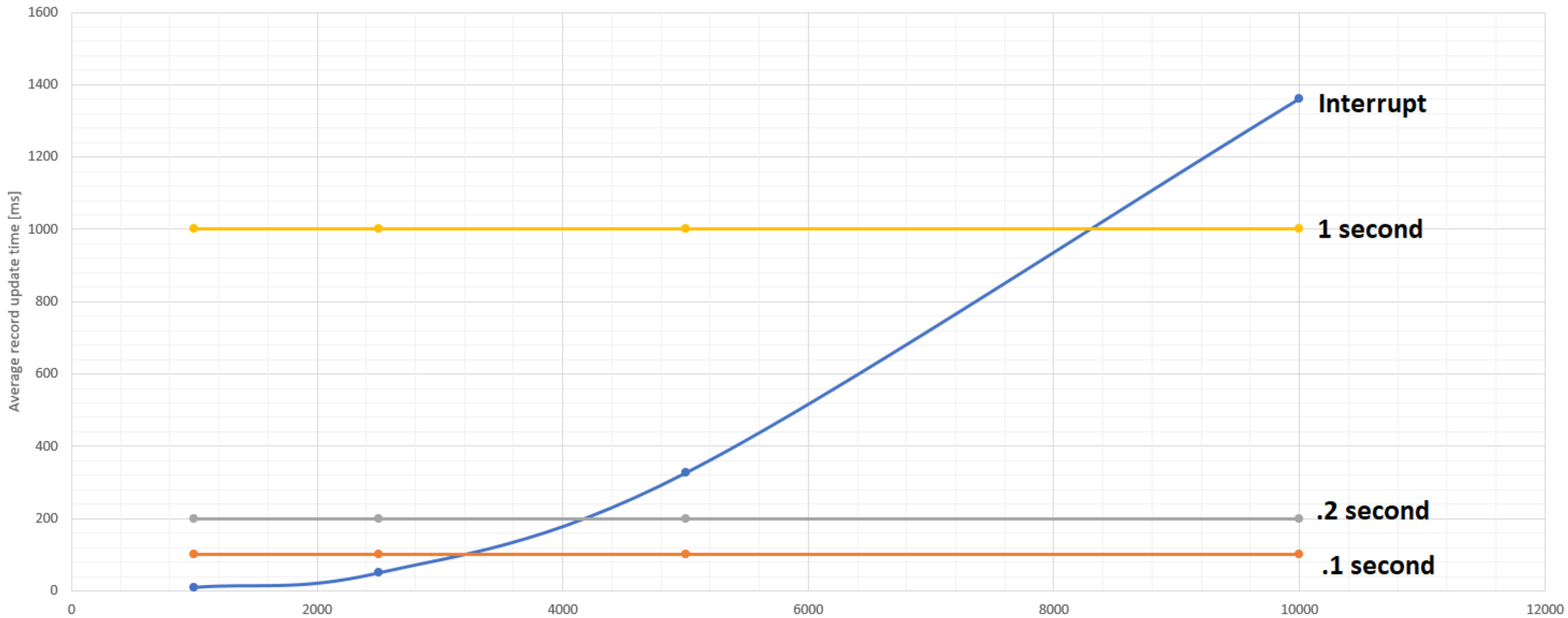# Cosylab's ADS device support

- Developed a couple of years ago

- So far, only used by our customers

- We decided we want to publish it as open source

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Why do we think it is useful

- Very fast because of sum reads

- Beckhoff example:

  - Single reads: 4k variables with 2ms protocol time = **8000 ms to scan all variables**

  - Sum reads: 4k variables with 2m protocol time = **20 ms to scan all variables**

- Our tests:

  - Stable reading 10,000 variables when using periodic scan rates

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Performance numbers

- These numbers are for 1k – 10k ai records and 500 variables per ADS transaction.
  - PLC cycle time is 10ms.
  - PLC variables are *LREAL*

- Updates were stable at all scan rates.

- Interrupt scan rate averages:
  - 1k records: 10ms
  - 2.5k records: 50ms
  - 5k records: 326ms
  - 10k records: 1362ms

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How do we use it

- It's based on AutoparamDriver

- Reason structure:

  - DataType   NumElements   Read/Write   AdsPort   VariableName

- Example:

  - field(INP, "@asyn(test 0 0) BOOL R P=PLC_TC3 V=SomeStruct.switchStatus")

  - field(OUT, "@asyn(test 0 0) USINT[] N=10 W P=851 V=SomeStruct.ucharTest")

  - field(INP, "@asynMask(test 0 0xFFFF 0) UINT_digi R P=851 V=SomeStruct.mbbid")

Potential limitations EPICS developers should be aware of

- Maximum of 2048 kB of data per transfer

- Recommended maximum of 500 variables per transfer

  - This is recommended by Beckhoff

  - Value can be changed

Where can you get it?

- https://epics.cosylab.com

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Thank you