Testing of a telecommunication protocol using constraint programming

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- The LTE Radio Base Station (RBS) is SUT at our department at Ericsson.

- Our case study is the Public Warning System.

- Test harness should analyze User Equipment protocol logs. Protocol logs are sequences of messages with timestamps.

- We use MiniZinc constraint solving system for protocol log analysis.

- Protocol log analysis includes checks that protocol log contains correct messages with correct timing and content.

- The model consists of constraints on arrays of timestamps and message content
  - Arrays of decision variables of correct timestamps of messages.
  - Arrays of parameters which contain timestamps and content of messages from the log.
  - Boolean decision variables indicate errors in the log
- $(\exists\, 1 \leq i \leq numberSIB11log)$
  $\left(SIB11TimeLog_i > PagSN_{number of broadcasts}\right)$
  $\leftrightarrow SIB11afterpagind = 1$
- Protocol log analysis is an optimization problem. We minimize sum of Boolean decision variables