

# Testing benchmarking and logging

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November 2018

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## **Abstract**

abstract ...

# Chapter 1

## Test coverage

### 1.1 Coverage

Test coverage is calculated as the fraction of functions which are called from test routines. This percentage is calculated by the tool *hpc* with a call to

```
cabal new-test
```

Add to a local `cabal.project.local` file these lines:

```
tests:           True
coverage:        True
library-coverage: True
```

Cardano.BM.Data.Trace	100%
Cardano.BM.Counters.Dummy	100%
Cardano.BM.Counters	100%
Cardano.BM.BaseTrace	80%
Cardano.BM.Observer.Monad	75%
Cardano.BM.Counters.Common	66%
Cardano.BM.Data.Counter	56%
Cardano.BM.Data.Configuration	50%
Cardano.BM.Data.Severity	45%
Cardano.BM.Data.LogItem	40%
Cardano.BM.Data.BackendKind	40%
Cardano.BM.Trace	38%
Cardano.BM.Observer.STM	33%
Cardano.BM.Configuration.Model	32%
Cardano.BM.Setup	25%
Cardano.BM.Data.Aggregated	23%
Cardano.BM.Data.Output	22%
Cardano.BM.Data.Observable	10%
Cardano.BM.Output.Switchboard	0%
Cardano.BM.Output.Log	0%
Cardano.BM.Output.EKGView	0%
Cardano.BM.Output.Aggregation	0%
Cardano.BM.Data.SubTrace	0%
Cardano.BM.Data.Rotation	0%
Cardano.BM.Data.Backend	0%
Cardano.BM.Configuration	0%
Paths.iohk_monitoring	0%
	28%

Figure 1.1: Test coverage of modules in percent as computed by the tool 'hpc'

# Chapter 2

## Testing

### 2.1 Test main entry point

```
module Main
(
    main
) where
import Test.Tasty
import qualified Cardano.BM.Test.Aggregated (tests)
import qualified Cardano.BM.Test.STM (tests)
import qualified Cardano.BM.Test.Trace (tests)
import qualified Cardano.BM.Test.Configuration (tests)
main :: IO ()
main = defaultMain tests
tests :: TestTree
tests =
    testGroup "iohk-monitoring"
    [ Cardano.BM.Test ◦ Aggregated.tests
    , Cardano.BM.Test ◦ STM.tests
    , Cardano.BM.Test ◦ Trace.tests
    , Cardano.BM.Test ◦ Configuration.tests
    ]
```

#### 2.1.1 instance Arbitrary Aggregated

We define an instance of *Arbitrary* for an *Aggregated* which lets *QuickCheck* generate arbitrary instances of *Aggregated*. For this an arbitrary list of *Integer* is generated and this list is aggregated into a structure of *Aggregated*.

```
instance Arbitrary Aggregated where
    arbitrary = do
        vs' ← arbitrary :: Gen [Integer]
        let sum2 = foldr ( $\lambda e a \rightarrow a + e * e$ ) 0
        vs = 42 : 17 : vs'
```

```

    return $ AggregatedStats (Stats
      (Pure (last vs))
      (Pure (minimum vs))
      (Pure (maximum vs))
      (toInteger $ length vs)
      (Pure (sum vs))
      (Pure (sum2 vs))
    )

```

### 2.1.2 Testing aggregation

```

tests :: TestTree
tests = testGroup "aggregation measurements" [
  property_tests
, unit_tests
]

property_tests :: TestTree
property_tests = testGroup "Properties" [
  testProperty "minimal" prop_Aggregation_minimal
, testProperty "commutative" prop_Aggregation_comm
]

unit_tests :: TestTree
unit_tests = testGroup "Unit tests" [
  testCase "initial_minus_1" unit_Aggregation_initial_minus_1
, testCase "initial_plus_1" unit_Aggregation_initial_plus_1
, testCase "initial_0" unit_Aggregation_initial_zero
]

prop_Aggregation_minimal :: Bool
prop_Aggregation_minimal = True

prop_Aggregation_comm :: Integer → Integer → Aggregated → Bool
prop_Aggregation_comm v1 v2 ag =
  let Just (AggregatedStats stats1) = updateAggregation (Pure v1) $ updateAggregation (Pure v2) (Just ag)
      Just (AggregatedStats stats2) = updateAggregation (Pure v2) $ updateAggregation (Pure v1) (Just ag)
  in
    fmin stats1 ≡ fmin stats2 ∧
    fmax stats1 ≡ fmax stats2 ∧
    fcount stats1 ≡ fcount stats2 ∧
    fsum_A stats1 ≡ fsum_A stats2 ∧
    fsum_B stats1 ≡ fsum_B stats2 ∧
    ((v1 ≡ v2) 'implies' (flast stats1 ≡ flast stats2))

-- implication: if p1 is true, then return p2; otherwise true
implies :: Bool → Bool → Bool
implies p1 p2 = (¬ p1) ∨ p2

unit_Aggregation_initial_minus_1 :: Assertion
unit_Aggregation_initial_minus_1 =

```

```

    updateAggregation (-1) Nothing @? = Just (AggregatedStats (Stats (-1) (-1) (-1) 1 (-1) 1))
unit_Aggregation_initial_plus_1 :: Assertion
unit_Aggregation_initial_plus_1 =
    updateAggregation 1 Nothing @? = Just (AggregatedStats (Stats 1 1 1 1 1 1))
unit_Aggregation_initial_zero :: Assertion
unit_Aggregation_initial_zero =
    updateAggregation 0 Nothing @? = Just (AggregatedStats (Stats 0 0 0 1 0 0))

```

### 2.1.3 STM

```

module Cardano.BM.Test.STM (
    tests
) where
import Test.Tasty
import Test.Tasty.QuickCheck
tests :: TestTree
tests = testGroup "observing STM actions" [
    testProperty "minimal" prop_STM_observer
]
prop_STM_observer :: Bool
prop_STM_observer = True

```

### 2.1.4 Trace

```

tests :: TestTree
tests = testGroup "testing Trace" [
    unit_tests
    , testCase "forked traces stress testing" stress_trace_in_fork
    , testCase "stress testing: ObservableTrace vs. NoTrace" timing_Observable_vs_Untimed
    , testCaseInfo "demonstrating nested named context logging" example_with_named_contexts
]
unit_tests :: TestTree
unit_tests = testGroup "Unit tests" [
    testCase "opening messages should not be traced" unit_noOpening_Trace
    , testCase "hierarchy of traces" unit_hierarchy
    , testCase "forked traces" unit_trace_in_fork
    , testCase "hierarchy of traces with NoTrace" $
        unit_hierarchy' [Neutral, NoTrace, (ObservableTrace observablesSet)]
        onlyLevelOneMessage
    , testCase "hierarchy of traces with DropOpening" $
        unit_hierarchy' [Neutral, DropOpening, (ObservableTrace observablesSet)]
        notObserveOpen
    , testCase "hierarchy of traces with UntimedTrace" $
        unit_hierarchy' [Neutral, UntimedTrace, UntimedTrace]
]

```



```

    observeOpenWithoutMeasures
,testCase "changing the minimum severity of a trace at runtime"
    unitttraceminseverity
,testCase "changing the minimum severity of a named context at runtime"
    unitnamedminseverity
,testCase "appending names should not exceed 80 chars" unitaappendname
]
where
  observablesSet = [ MonotonicClock, MemoryStats ]
  notObserveOpen :: [ LogObject ] → Bool
  notObserveOpen = all (λcase { ObserveOpen _ → False; _ → True })
  onlyLevelOneMessage :: [ LogObject ] → Bool
  onlyLevelOneMessage = λcase
    [ LP (LogMessage (LogItem _ _ "Message from level 1. ")) ] → True
    _ → False
  observeOpenWithoutMeasures :: [ LogObject ] → Bool
  observeOpenWithoutMeasures = any $ λcase
    ObserveOpen (CounterState _ counters) → null counters
    _ → False

```

## Helper routines

```

data TraceConfiguration = TraceConfiguration
  { tcOutputKind :: OutputKind
  , tcName       :: LoggerName
  , tcSubTrace   :: SubTrace
  , tcSeverity   :: Severity
  }

testStdoutConfiguration :: LoggerName → SubTrace → Severity → ConfigurationInternal
testStdoutConfiguration name subtrace severity = ConfigurationInternal
  { cgMinSeverity   = severity
  , cgMapSeverity   = HM.empty
  , cgMapSubtrace   = HM.singleton name subtrace
  , cgOptions       = HM.empty
  , cgMapBackend    = HM.empty
  , cgDefBackendKs  = [ KatipBK, AggregationBK ]
  , cgSetupBackends = [ KatipBK, AggregationBK ]
  , cgMapScribe     = HM.empty
  , cgDefScribes    = [ "StdoutSK" ]
  , cgSetupScribes  = [ scribeDefinition ]
  , cgPortEKG       = 0
  , cgPortGUI       = 0
  }
where
  scribeDefinition = ScribeDefinition
    { scKind = StdoutSK

```

```

    ,scName = "stdout"
    ,scRotation = Nothing
  }
setupTrace :: TraceConfiguration → IO (Trace IO)
setupTrace (TraceConfiguration outk name subTr sev) = do
  c ← liftIO $ Cardano.BM.Configuration ∘ Model.empty
  mockSwitchboard ← newMVar $ error "Switchboard uninitialized."
  ctx ← liftIO $ newContext name c sev $ Switchboard mockSwitchboard
  let logTrace0 = case outk of
    TVarList tvar → BaseTrace.natTrace liftIO $ traceInTVarIO tvar
    TVarListNamed tvar → BaseTrace.natTrace liftIO $ traceNamedInTVarIO tvar
  setSubTrace (configuration ctx) name (Just subTr)
  logTrace' ← subTrace "" (ctx, logTrace0)
  return logTrace'
setTransformer_ :: Trace IO → LoggerName → Maybe SubTrace → IO ()
setTransformer_ (ctx, _) name subtr = do
  let c = configuration ctx
  n = (loggerName ctx) <> " ." <> name
  setSubTrace c n subtr

```

### Example of using named contexts with *Trace*

```

example_with_named_contexts :: IO String
example_with_named_contexts = do
  cfg ← newMVar $ testStdoutConfiguration "test" Neutral Debug
  logTrace ← Setup.setupTrace (Right (Configuration cfg)) "test"
  putStrLn "\n"
  logInfo logTrace "entering"
  logTrace0 ← appendName "simple-work-0" logTrace
  work0 ← complexWork0 logTrace0 "0"
  logTrace1 ← appendName "complex-work-1" logTrace
  work1 ← complexWork1 logTrace1 "42"
  Async.wait work0
  Async.wait work1
  -- the named context will include "complex" in the logged message
  logInfo logTrace "done."
  threadDelay 1000
  return ""
where
  complexWork0 tr msg = Async.async $ logInfo tr ("let's see (0): " 'append' msg)
  complexWork1 tr msg = Async.async $ do
    logInfo tr ("let's see (1): " 'append' msg)
    trInner@(ctx, _) ← appendName "inner-work-1" tr
    let observablesSet = [MonotonicClock]
    setSubTrace (configuration ctx) "test.complex-work-1.inner-work-1.STM-action" $
      Just $ ObservableTrace observablesSet

```

```

_ ← STMObserver.bracketObserveIO trInner "STM-action" setVar_
logInfo trInner "let's see: done."
-- logInfo logTrace' "let's see: done."

```

### Show effect of turning off observables

```

run_timed_action :: Trace IO → IO Microsecond
run_timed_action logTrace = do
  runid ← newUnique
  t0 ← getMonoClock
  forM_ [1 :: Int]..10] $ const $ observeAction logTrace
  t1 ← getMonoClock
  return $ diffTimeObserved (CounterState runid t0) (CounterState runid t1)
where
  observeAction trace = do
    _ ← MonadicObserver.bracketObserveIO trace "" action
    return ()
  action = return $ forM [1 :: Int]..100] $ \_ → reverse [1 :: Int]..1000]
timing_Observable_vs_Untimed :: Assertion
timing_Observable_vs_Untimed = do
  msgs1 ← STM.newTVarIO []
  traceObservable ← setupTrace $ TraceConfiguration
    (TVarList msgs1)
    "observables"
    (ObservableTrace observablesSet)
    Debug
  msgs2 ← STM.newTVarIO []
  traceUntimed ← setupTrace $ TraceConfiguration
    (TVarList msgs2)
    "no timing"
    UntimedTrace
    Debug
  msgs3 ← STM.newTVarIO []
  traceNoTrace ← setupTrace $ TraceConfiguration
    (TVarList msgs3)
    "no trace"
    NoTrace
    Debug
  t_observable ← run_timed_action traceObservable
  t_untimed ← run_timed_action traceUntimed
  t_notrace ← run_timed_action traceNoTrace
  assertBool
    ("Untimed consumed more time than ObservableTrace " ++ (show [t_untimed,t_observable]))
    (t_untimed < t_observable)
  assertBool
    ("NoTrace consumed more time than ObservableTrace " ++ (show [t_notrace,t_observable]))

```

```

    (t_notrace < t_observable)
  assertBool
    ("NoTrace consumed more time than Untimed" ++ (show [t_notrace, t_untimed]))
    True
  where
    observablesSet = [MonotonicClock, MemoryStats]

```

### Control tracing in a hierarchy of Traces

We can lay out traces in a hierarchical manner, that the children forward traced items to the parent *Trace*. A *NoTrace* introduced in this hierarchy will cut off a branch from messaging to the root.

```

unit_hierarchy :: Assertion
unit_hierarchy = do
  msgs ← STM.newTVarIO []
  trace0 ← setupTrace $ TraceConfiguration (TVarList msgs) "test" Neutral Debug
  logInfo trace0 "This should have been displayed!"
  -- subtrace of trace which traces nothing
  setTransformer trace0 "inner" (Just NoTrace)
  trace1 ← subTrace "inner" trace0
  logInfo trace1 "This should NOT have been displayed!"
  setTransformer trace1 "innermost" (Just Neutral)
  trace2 ← subTrace "innermost" trace1
  logInfo trace2 "This should NOT have been displayed also due to the trace one level above!"
  -- acquire the traced objects
  res ← STM.readTVarIO msgs
  -- only the first message should have been traced
  assertBool
    ("Found more or less messages than expected: " ++ show res)
    (length res == 1)

```

### Change a trace's minimum severity

A trace is configured with a minimum severity and filters out messages that are labelled with a lower severity. This minimum severity of the current trace can be changed.

```

unit_trace_min_severity :: Assertion
unit_trace_min_severity = do
  msgs ← STM.newTVarIO []
  trace@(ctx, _) ← setupTrace $ TraceConfiguration (TVarList msgs) "test min severity" Neutral Debug
  logInfo trace "Message #1"
  -- raise the minimum severity to Warning
  setMinSeverity (configuration ctx) Warning
  msev ← Cardano.BM.Configuration.minSeverity (configuration ctx)
  assertBool ("min severity should be Warning, but is " ++ (show msev))

```

```

    (msev  $\equiv$  Warning)
-- this message will not be traced
logInfo trace "Message #2"
-- lower the minimum severity to Info
setMinSeverity (configuration ctx) Info
-- this message is traced
logInfo trace "Message #3"
-- acquire the traced objects
res  $\leftarrow$  STM.readTVarIO msgs
-- only the first and last messages should have been traced
assertBool
  ("Found more or less messages than expected: " ++ show res)
  (length res  $\equiv$  2)
assertBool
  ("Found Info message when Warning was minimum severity: " ++ show res)
  (all ( $\lambda$ case {(LP (LogMessage (LogItem _ Info "Message #2"))}  $\rightarrow$  False; _  $\rightarrow$  True)} res)

```

### Change the minimum severity of a named context

A trace of a named context can be configured with a minimum severity, such that the trace will filter out messages that are labelled with a lower severity.

```

unitnamedminseverity :: Assertion
unitnamedminseverity = do
  msgs  $\leftarrow$  STM.newTVarIO []
  trace0  $\leftarrow$  setupTrace $ TraceConfiguration (TVarList msgs) "test named severity" Neutral Debug
  trace@(ctx, _)  $\leftarrow$  appendName "sev-change" trace0
  logInfo trace "Message #1"
  -- raise the minimum severity to Warning
  setSeverity (configuration ctx) (loggerName ctx) (Just Warning)
  msev  $\leftarrow$  Cardano.BM.Configuration.inspectSeverity (configuration ctx) (loggerName ctx)
  assertBool ("min severity should be Warning, but is " ++ (show msev))
    (msev  $\equiv$  Just Warning)
  -- this message will not be traced
  logInfo trace "Message #2"
  -- lower the minimum severity to Info
  setSeverity (configuration ctx) (loggerName ctx) (Just Info)
  -- this message is traced
  logInfo trace "Message #3"
  -- acquire the traced objects
  res  $\leftarrow$  STM.readTVarIO msgs
  -- only the first and last messages should have been traced
  assertBool
    ("Found more or less messages than expected: " ++ show res)
    (length res  $\equiv$  2)
  assertBool

```

```

("Found Info message when Warning was minimum severity: " ++ show res)
(all ( $\lambda$ case {(LP (LogMessage (LogItem _Info "Message #2"))}  $\rightarrow$  False; _  $\rightarrow$  True}) res)

```

```

unit_hierarchy' :: [SubTrace]  $\rightarrow$  ([LogObject]  $\rightarrow$  Bool)  $\rightarrow$  Assertion
unit_hierarchy' subtraces f = do
  let (t1 : t2 : t3 : _) = cycle subtraces
  msgs  $\leftarrow$  STM.newTVarIO []
  -- create trace of type 1
  trace1  $\leftarrow$  setupTrace $ TraceConfiguration (TVarList msgs) "test" t1 Debug
  logInfo trace1 "Message from level 1."
  -- subtrace of type 2
  setTransformer_trace1 "inner" (Just t2)
  trace2  $\leftarrow$  subTrace "inner" trace1
  logInfo trace2 "Message from level 2."
  -- subsubtrace of type 3
  setTransformer_trace2 "innermost" (Just t3)
  _  $\leftarrow$  STMObserver.bracketObserveIO trace2 "innermost" setVar_
  logInfo trace2 "Message from level 3."
  -- acquire the traced objects
  res  $\leftarrow$  STM.readTVarIO msgs
  -- only the first message should have been traced
  assertBool
    ("Found more or less messages than expected: " ++ show res)
    (f res)

```

```

unit_trace_in_fork :: Assertion
unit_trace_in_fork = do
  msgs  $\leftarrow$  STM.newTVarIO []
  trace  $\leftarrow$  setupTrace $ TraceConfiguration (TVarListNamed msgs) "test" Neutral Debug
  trace0  $\leftarrow$  appendName "work0" trace
  trace1  $\leftarrow$  appendName "work1" trace
  work0  $\leftarrow$  work trace0
  threadDelay 5000
  work1  $\leftarrow$  work trace1
  Async.wait $ work0
  Async.wait $ work1
  res  $\leftarrow$  STM.readTVarIO msgs
  let names@(_ : namesTail) = map lnName res
  -- each trace should have its own name and log right after the other
  assertBool
    ("Consecutive loggernames are not different: " ++ show names)
    (and $ zipWith ( $\neq$ ) names namesTail)
  where
    work :: Trace IO  $\rightarrow$  IO (Async.Async ())
    work trace = Async.async $ do
      logInfoDelay trace "1"

```

```

    logInfoDelay trace "2"
    logInfoDelay trace "3"
logInfoDelay :: Trace IO → Text → IO ()
logInfoDelay trace msg =
    logInfo trace msg >>
    threadDelay 10000

stress_trace_in_fork :: Assertion
stress_trace_in_fork = do
    msgs ← STM.newTVarIO [ ]
    trace ← setupTrace $ TraceConfiguration (TVarListNamed msgs) "test" Neutral Debug
    let names = map (λa → ("work-" <> pack (show a))) [1..(10 :: Int)]
    ts ← forM names $ λname → do
        trace' ← appendName name trace
        work trace'
    forM_ ts Async.wait
    res ← STM.readTVarIO msgs
    let resNames = map lnName res
    let frequencyMap = fromListWith (+) [(x, 1) | x ← resNames]
    -- each trace should have traced 'totalMessages' messages
    assertBool
        ("Frequencies of logged messages according to logname: " ++ show frequencyMap)
        (all (λname → (lookup ("test." <> name) frequencyMap) ≡ Just totalMessages) names)
where
    work :: Trace IO → IO (Async.Async ())
    work trace = Async.async $ forM_ [1..totalMessages] $ (logInfo trace) ∘ pack ∘ show
    totalMessages :: Int
    totalMessages = 10

unit_noOpening_Trace :: Assertion
unit_noOpening_Trace = do
    msgs ← STM.newTVarIO [ ]
    logTrace ← setupTrace $ TraceConfiguration (TVarList msgs) "test" DropOpening Debug
    _ ← STMObserver.bracketObserveIO logTrace "setTVar" setVar_
    res ← STM.readTVarIO msgs
    assertBool
        ("Found non-expected ObserveOpen message: " ++ show res)
        (all (λcase { ObserveOpen _ → False; _ → True }) res)

```

### Assert maximum length of log context name

The name of the log context cannot grow beyond a maximum number of characters, currently the limit is set to 80.

```

unit_append_name :: Assertion
unit_append_name = do

```

```

    cfg ← newMVar $ testStdoutConfiguration "test" Neutral Debug
    trace0 ← Setup.setupTrace (Right (Configuration cfg)) "test"
    trace1 ← appendName bigName trace0
    (ctx2, _) ← appendName bigName trace1
    assertBool
      ("Found logger name with more than 80 chars: " ++ show (loggerName ctx2))
      (T.length (loggerName ctx2) ≤ 80)
  where
    bigName = T.replicate 30 "abcdefghijklmnopqrstuvwxy"

```

```

setVar_ :: STM.STM Integer
setVar_ = do
  t ← STM.newTVar 0
  STM.writeTVar t 42
  res ← STM.readTVar t
  return res

```

### 2.1.5 Testing configuration

#### Test declarations

```

tests :: TestTree
tests = testGroup "config tests" [
  property_tests
, unit_tests
]

property_tests :: TestTree
property_tests = testGroup "Properties" [
  testProperty "minimal" prop_Configuration_minimal
]

unit_tests :: TestTree
unit_tests = testGroup "Unit tests" [
  testCase "static_representation" unit_Configuration_static_representation
, testCase "parsed_representation" unit_Configuration_parsed_representation
, testCase "include_EKG_if_defined" unit_Configuration_check_EKG_positive
, testCase "not_include_EKG_if_ndef" unit_Configuration_check_EKG_negative
]

```

#### Property tests

```

prop_Configuration_minimal :: Bool
prop_Configuration_minimal = True

```



## Unit tests

The configuration file only indicates that EKG is listening on port nnnnn. Infer that *EKGViewBK* needs to be started as a backend.

```
unit_Configuration_check_EKG_positive :: Assertion
unit_Configuration_check_EKG_positive = do
  let c = ["rotation:"
    , "  rpLogLimitBytes: 5000000"
    , "  rpKeepFilesNum: 10"
    , "  rpMaxAgeHours: 24"
    , "minSeverity: Info"
    , "defaultBackends:"
    , "  - KatipBK"
    , "setupBackends:"
    , "  - KatipBK"
    , "defaultScribes:"
    , "- - StdoutSK"
    , "  - stdout"
    , "setupScribes:"
    , "- scName: stdout"
    , "  scRotation: null"
    , "  scKind: StdoutSK"
    , "hasEKG: 18321"
    , "options:"
    , "  test:"
    , "    value: nothing"
    ]
  fp = "/tmp/test_ekgv_config.yaml"
  writeFile fp $ unlines c
  repr ← parseRepresentation fp
  assertBool "expecting EKGViewBK to be setup" $
    EKGViewBK ∈ (setupBackends repr)
```

If there is no port defined for EKG, then do not start it even if present in the config.

```
unit_Configuration_check_EKG_negative :: Assertion
unit_Configuration_check_EKG_negative = do
  let c = ["rotation:"
    , "  rpLogLimitBytes: 5000000"
    , "  rpKeepFilesNum: 10"
    , "  rpMaxAgeHours: 24"
    , "minSeverity: Info"
    , "defaultBackends:"
    , "  - KatipBK"
    , "  - EKGViewBK"
    , "setupBackends:"
    , "  - KatipBK"
```

```

, " - EKGViewBK"
,"defaultScribes:"
, " - StdoutSK"
, " - stdout"
,"setupScribes:"
, " - scName: stdout"
, "   scRotation: null"
, "   scKind: StdoutSK"
, "###hasEKG: 18321"
,"options:"
, "  test:"
, "    value: nothing"
]
fp = "/tmp/test_ekgv_config.yaml"
writeFile fp $unlines c
repr ← parseRepresentation fp
assertBool "EKGViewBK shall not be setup" $
  ¬ $ EKGViewBK ∈ (setupBackends repr)
assertBool "EKGViewBK shall not receive messages" $
  ¬ $ EKGViewBK ∈ (defaultBackends repr)

```

*unit\_Configuration\_static\_representation :: Assertion*

*unit\_Configuration\_static\_representation =*

```

let r = Representation
  { minSeverity = Info
  , rotation = RotationParameters 5000000 24 10
  , setupScribes =
    [ ScribeDefinition { scName = "stdout"
                        , scKind = StdoutSK
                        , scRotation = Nothing }
    ]
  , defaultScribes = [ (StdoutSK, "stdout") ]
  , setupBackends = [ EKGViewBK, KatipBK ]
  , defaultBackends = [ KatipBK ]
  , hasGUI = Just 12789
  , hasEKG = Just 18321
  , options =
    HM.fromList [ ("test1", (HM.singleton "value" "object1"))
                 , ("test2", (HM.singleton "value" "object2")) ]
  }
in
  encode r @? = "
rotation:\n"
"  rpLogLimitBytes: 5000000\n"
"  rpKeepFilesNum: 10\n"
"  rpMaxAgeHours: 24\n"
"defaultBackends:\n"

```

```

"- KatipBK\n"
"setupBackends:\n"
"- EKGViewBK\n"
"- KatipBK\n"
"hasGUI: 12789\n"
"defaultScribes:\n"
"- - StdoutSK\n"
"  - stdout\n"
"options:\n"
"  test2:\n"
"    value: object2\n"
"  test1:\n"
"    value: object1\n"
"setupScribes:\n"
"- scName: stdout\n"
"  scRotation: null\n"
"  scKind: StdoutSK\n"
"hasEKG: 18321\n"
"minSeverity: Info\n"
unit.Configuration_parsed_representation :: Assertion
unit.Configuration_parsed_representation = do
  repr ← parseRepresentation "test/config.yaml"
  encode repr @? = ""
"rotation:\n"
"  rpLogLimitBytes: 5000000\n"
"  rpKeepFilesNum: 10\n"
"  rpMaxAgeHours: 24\n"
"defaultBackends:\n"
"- KatipBK\n"
"setupBackends:\n"
"- AggregationBK\n"
"- EKGViewBK\n"
"- KatipBK\n"
"hasGUI: null\n"
"defaultScribes:\n"
"- - StdoutSK\n"
"  - stdout\n"
"options:\n"
"  mapSubtrace:\n"
"    iohk.benchmarking:\n"
"      tag: ObservableTrace\n"
"      contents:\n"
"        - GhcRtsStats\n"
"        - MonotonicClock\n"
"    iohk.deadend: NoTrace\n"
"  mapSeverity:\n"
"    iohk.startup: Debug\n"

```

```
"    iohk.background.process: Error\n"
"    iohk.testing.uncritical: Warning\n"
"    cfokey:\n"
"        value: Release-1.0.0\n"
"    mapScribes:\n"
"        iohk.interesting.value:\n"
"            - StdoutSK::stdout\n"
"            - FileTextSK::testlog\n"
"        iohk.background.process: FileTextSK::testlog\n"
"    mapBackends:\n"
"        iohk.interesting.value:\n"
"            - EKGViewBK\n"
"            - AggregationBK\n"
"setupScribes:\n"
"- scName: testlog\n"
"    scRotation:\n"
"        rpLogLimitBytes: 25000000\n"
"        rpKeepFilesNum: 3\n"
"        rpMaxAgeHours: 24\n"
"    scKind: FileTextSK\n"
"- scName: stdout\n"
"    scRotation: null\n"
"    scKind: StdoutSK\n"
"hasEKG: 12789\n"
"minSeverity: Info\n"
```