Takipi

Notes From The Field

by Dmitriy Pariyskiy
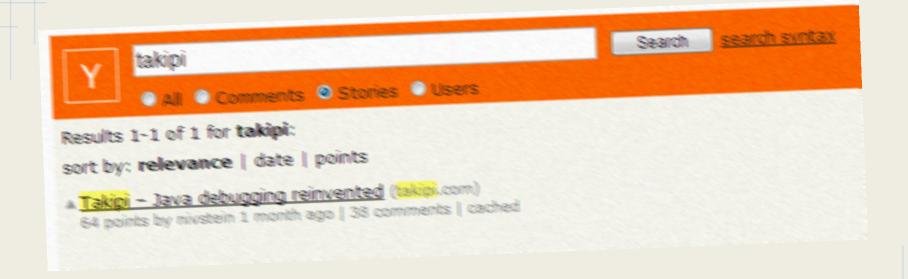
Any clojure.core contributors here tonight?

Thank you!

Thank you!
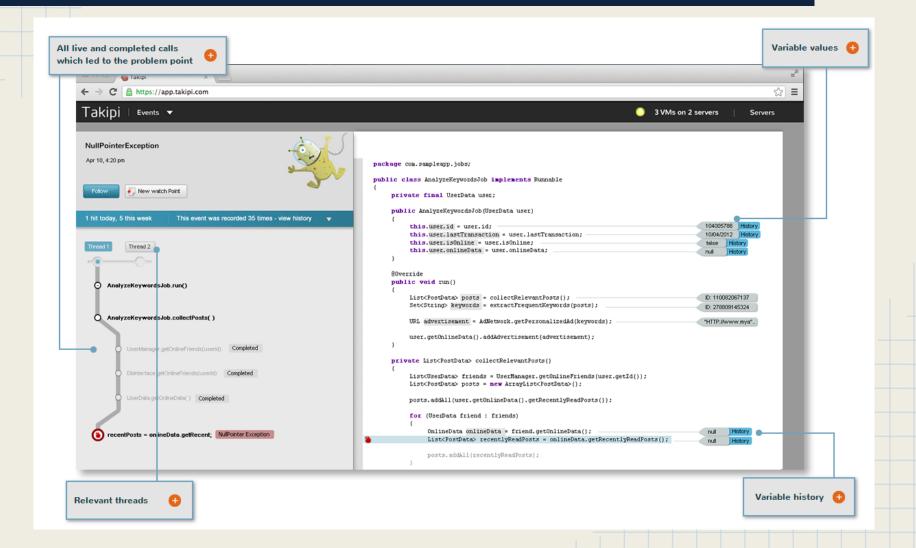
I'm Sorry.

What is Takipi?
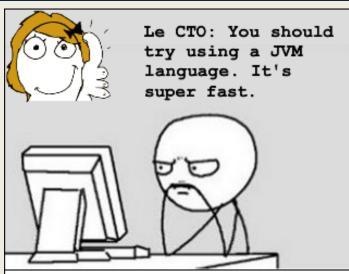
First sighting: May 22nd 2013

What is Takipi?

What's it Good For?
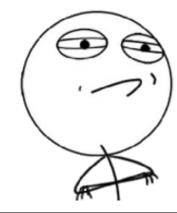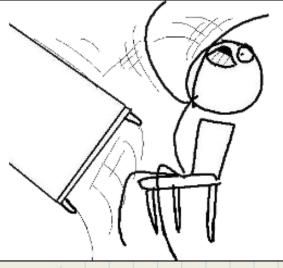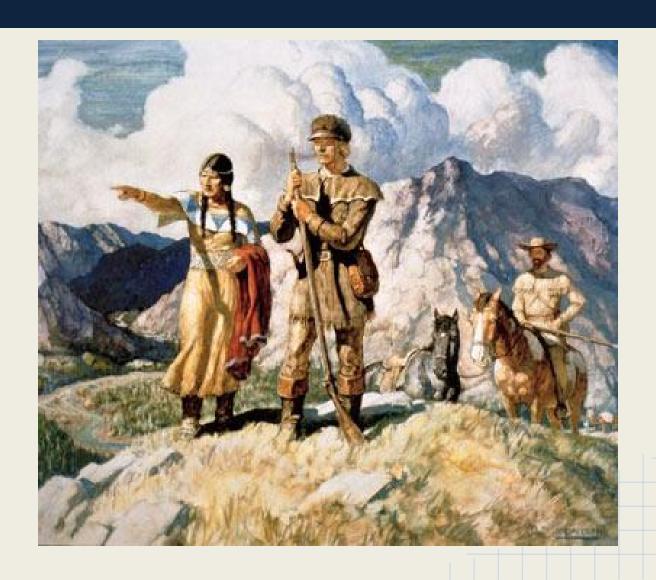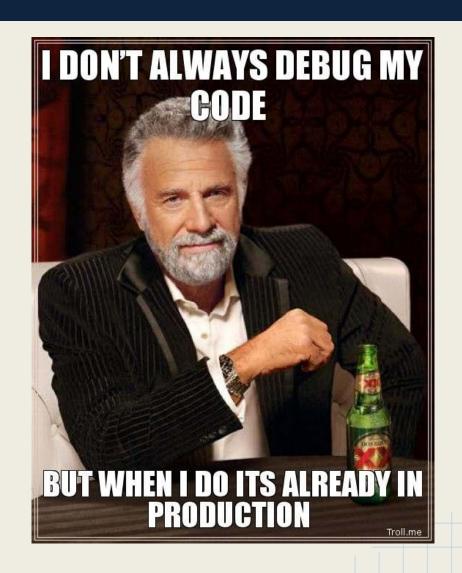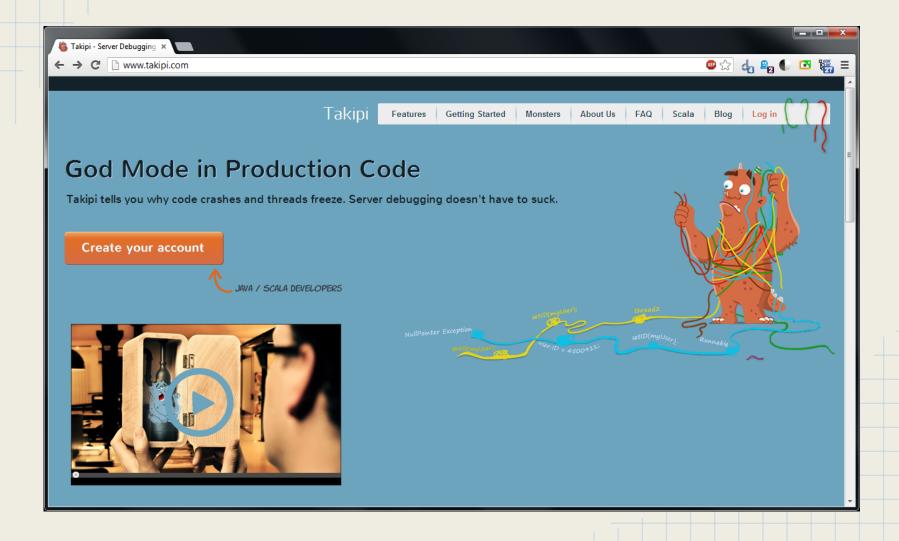
What's it Good For?

What's it Good For?

Getting Started

Getting Started
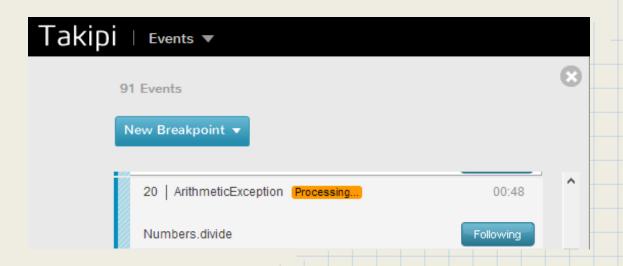
```
wget https://s3.amazonaws.com/app-takipi-com/deploy/linux/takipi-installer
sudo bash ./takipi-installer -i --secret_key=Your secret key
source /opt/takipi/etc/auto-agent
```

```
lein new tkptest; cd tkptest
```



```
dp@WebDevVM:/var/clojure/tkptest$ lein repl
Picked up JAVA_TOOL_OPTIONS: -agentlib:TakipiAgent
Picked up JAVA_TOOL_OPTIONS: -agentlib:TakipiAgent
```


2 VMs on 1 Machine | Settings | Dmitriy Pariyskiy, Logout

```
user=> (/ 1 0)
```


Takipi | Events ▾

91 Events

New Breakpoint ▾

20 | ArithmeticException Processing...   00:48

Numbers.divide   Following

Takipi   Events ▾

🟢 2 VMs on 1 Machine | Settings | Dmitriy Pariyskiy, Logout

ArithmeticException

Jul 17, 11:46 am

Following   🔲 New Breakpoint

1 hit today, 121 this week   This event was recorded 32 times - view history ▶

- AFn.run
- core$comp$fn__4154.invoke
- RestFn.invoke
- core$with_bindings_STAR_.doInvoke
- core$apply.invoke
- AFn.applyTo
- AFn.applyToHelper
- RestFn.invoke
- main$repl.doInvoke
- main$repl$fn__6597.invoke
- main$repl$read_eval_print__6588.invoke
- main$repl$read_eval_print__6588$fn__6591.invoke
- core$eval.invoke
- Compiler.eval
- Compiler.eval
- Numbers.divide
- Numbers.divide
- ➡️ 🔴 throw new ArithmeticException("Divide by zero");

Click to set a breakpoint

clojure.lang.Numbers

```
    }

    public static Number minus(Object x, Object y) {
        Numbers.Ops yops = ops(y);
        return ops(x).combine(yops).add((Number)x, yops.negate((Number)
    }

    public static Number minusP(Object x, Object y) {
        Numbers.Ops yops = ops(y);
        Number negativeY = yops.negateP((Number)y);
        Numbers.Ops negativeYOps = ops(negativeY);
        return ops(x).combine(negativeYOps).addP((Number)x, negativeY);
    }

    public static Number multiply(Object x, Object y) {
        return ops(x).combine(ops(y)).multiply((Number)x, (Number)y);
    }

    public static Number multiplyP(Object x, Object y) {
        return ops(x).combine(ops(y)).multiplyP((Number)x, (Number)y);
    }

    public static Number divide(Object x, Object y) {        1        0
        Numbers.Ops yops = ops(y);
        if(yops.isZero((Number)y) != false) {          Numbers$LongOps
            throw new ArithmeticException("Divide by zero");
        } else {
            return ops(x).combine(yops).divide((Number)x, (Number)y);
        }
    }

    public static Number quotient(Object x, Object y) {
        Numbers.Ops yops = ops(y);
        if(yops.isZero((Number)y) != false) {
            throw new ArithmeticException("Divide by zero");
        } else {
            return ops(x).combine(yops).quotient((Number)x, (Number)y);
        }
    }

    public static Number remainder(Object x, Object y) {
        Numbers.Ops yops = ops(y);
```

🔴 At moment of event

Exception message	Divide by zero
x	1
y	0
yops	Numbers$LongOps ▾
System hashcode	id: 1400401527

Getting Started

Getting Started

Enter Your Top Package

tkptest
tkptest;clojure
tkptest;clojure;com;net;org

Configuring

Takipi   Events ▾

● 2 VMs on 1 Machine   Settings   Dmitriy Pariyskiy, Logout

RuntimeException

Jul 17, 2:33 pm

Following   New Breakpoint

3 hits today, 3 this week   This event was recorded 3 times - view history ▶

○ AFn.run
○ core$comp$fn__4154.invoke
○ RestFn.invoke
○ core$with_bindings_STAR_.doInvoke
○ core$apply.invoke
○ AFn.applyTo
○ AFn.applyToHelper
○ RestFn.invoke
○ main$repl.doInvoke
○ main$repl$fn__6597.invoke
○ main$repl$read_eval_print__6588.invoke
○ main$repl$read_eval_print__6588$fn__6589.invoke
○ core$read.invoke
○ core$read.invoke
○ LispReader.read
➡ ○ LispReader$UnmatchedDelimiterReader.invoke
🔴 throw Util.runtimeException((new StringBuilder()).append("Unmatched delimiter:

Click to set a breakpoint

clojure.lang.LispReader$UnmatchedDelimiterReader

```
package clojure.lang;

import clojure.lang.Util;


public class LispReader$UnmatchedDelimiterReader extends clojure.lang.n


    public clojure.lang.LispReader$UnmatchedDelimiterReader() {
        super();
    }

    public Object invoke(Object reader, Object rightdelim) {
        throw Util.runtimeException((new StringBuilder()).append("Unmatch
            ").append(rightdelim).toString());
    }
}
```

🔴 **At moment of event**

Local 0	LispReader$UnmatchedDelimiterReader ▾
System hashcode	id: 2133245250
reader	LineNumberingPushbackReader ▾
_atLineStart	false
_columnNumber	2
_prev	true
buf	CHAR[] ▶
in	LineNumberReader ▾
cb	CHAR[] ▶
in	StringReader ▾
length	1
lock	StringReader ▾
length	1
lock	StringReader ▾
System hashcode	id: 859376458
mark	0
next	1
skipBuffer	null
str	")"
System hashcode	id: 859376458
mark	0
next	1
skipBuffer	null
str	")"
System hashcode	id: 859376458
lineNumber	0
lock	StringReader ▶

Simple Tests

Takipi   Events ▼

● 1 VM on 1 Machine | Settings | Dmitriy Pariyskiy, Logout

NullPointerException

Jul 17, 4:19 pm

Following   New Breakpoint

1 hit today, 1 this week | This event was recorded 1 times - view history ▶

Thread-1

○ core.main
○ AFn.applyTo
○ AFn.applyToHelper
○ core$_main.invoke
○ core$_main$fn__27.invoke
○ core$null_pointer_test.invoke
➡ ⬤ (println chr))))

tkptest.core$null_pointer_test

```
(ns tkptest.core
    (:gen-class))

(defmacro infix-macro-test [form]
    (list (second form) (first form) (nth form 2)))

(defn null-pointer-test [chr]
    (doseq [x '(1 2 3 4)]                    PersistentList    0    0
        ((println x)
        (println chr))))                     PersistentList        .

(defn illegal-agument-test [mystr]
    (case mystr
        "" 0
        "hello" (count mystr)))

(defn stack-overflow-test [count]
    (print ".")
    (stack-overflow-test (inc count)))

(defn -main
    [test-name]
    (try
    (case test-name
        "null-pointer-test" (null-pointer-test \.)
        "illegal-argument-test" (illegal-agument-test "foo")
        "stack-overflow-test" (stack-overflow-test 1)
        "macro-test" (infix-macro-test (1 / 0)))
    (catch Exception e (println e)))
    (recur (read-line))))
```

Click to set a breakpoint

🔴 At moment of event

chr	.
chunk_18	null
count_19	0
i_20	0
Local 0	core$null_pointer_test ▾
__methodImplCache	null
System hashcode	id: 1449540880
seq_17	PersistentList ▾
_count	4
_first	1
_hash	-1
_hasheq	-1
_meta	PersistentArrayMap ▾
_hash	-1
_hasheq	-1
_meta	null
array	REFERENCE[] ▾
size	4 (4 recorded)
0:	Keyword ▾
_str	null
hash	1224345339
sym	Symbol ▸
System hashcode	id: 1947638432
1:	8
2:	Keyword ▾
_str	null
hash	-1799728879
sym	Symbol ▸

Simple Tests

Takipi   Events ▼   ● 1 VM on 1 Machine   Settings   Dmitriy Pariyskiy, Logout

IllegalArgumentException

Jul 17, 4:19 pm

[Following]   [New Breakpoint]

1 hit today, 1 this week | This event was recorded 1 times - view history ▶

Thread-1

- core.main
- AFn.applyTo
- AFn.applyToHelper
- core$_main.invoke
- core$_main$fn__27.invoke
- core$illegal_agument_test.invoke
➡ ● (case mystr

tkptest.core$illegal_agument_test

```
(ns tkptest.core
    (:gen-class))

(defmacro infix-macro-test [form]
    (list (second form) (first form) (nth form 2)))

(defn null-pointer-test [chr]
    (doseq [x '(1 2 3 4)]
        ((println x)
         (println chr))))

(defn illegal-agument-test [mystr]                    "foo"
    (case mystr
        "" 0
        "hello" (count mystr)))

(defn stack-overflow-test [count]
    (print ".")
    (stack-overflow-test (inc count)))


(defn -main
    [& args]
    (try
    (case (first args)
        "null-pointer-test" (null-pointer-test \.)
        "illegal-argument-test" (illegal-agument-test "foo")
        "stack-overflow-test" (stack-overflow-test 1)
        "macro-test" (infix-macro-test (1 / 0)))
    (catch Exception e (println e)))
    (recur (read-line)))
```

Click to set a breakpoint

At moment of event

Exception message	No matching clause: foo
G__24	null
Local 0	core$illegal_agument_test ▼
__methodImplCache	null
System hashcode	id: 177748940
mystr	"foo"

Simple Tests

Takipi   Events ▾

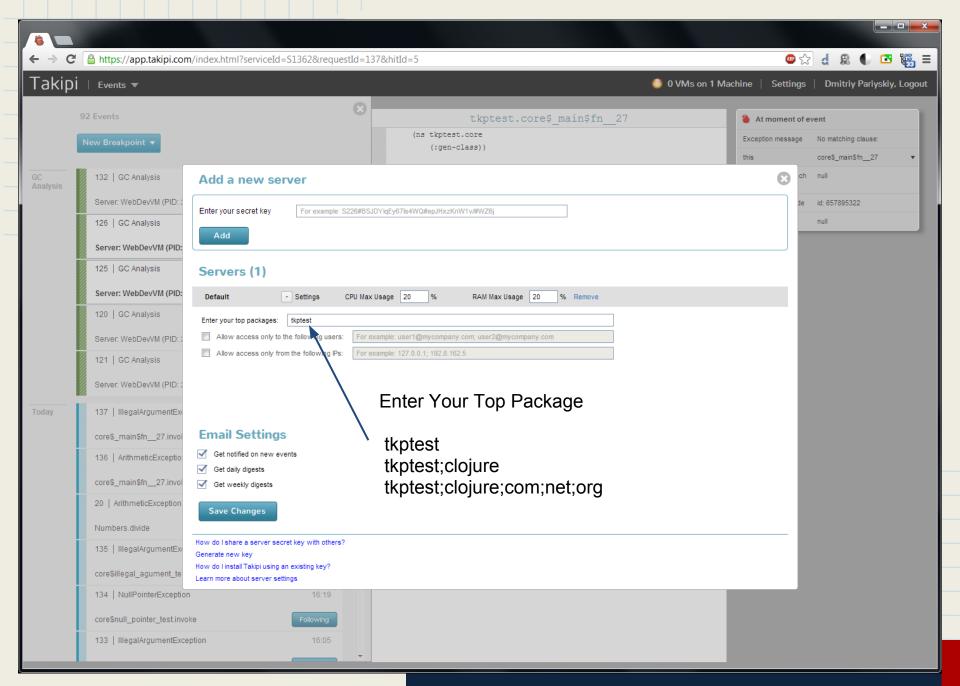● 1 VM on 1 Machine | Settings | Dmitriy Pariyskiy, Logout

ArithmeticException

Jul 17, 4:49 pm

Following | New Breakpoint

2 hits today, 2 this week | This event was recorded 2 times - view history ▶

Thread-1

○ core.main
○ core$_main.invoke
○ core$_main$fn__27.invoke
→ ● "macro-test" (infix-macro-test (1 / 0)))

tkptest.core$_main$fn__27

```
(ns tkptest.core
    (:gen-class))

(defmacro infix-macro-test [form]
    (list (second form) (first form) (nth form 2)))

(defn null-pointer-test [chr]
    (doseq [x '(1 2 3 4)]
        ((println x)
         (println chr))))

(defn illegal-agument-test [mystr]
 (case mystr
        "" 0
        "hello" (count mystr)))

(defn stack-overflow-test [count]
    (print ".")
    (stack-overflow-test (inc count)))



(defn -main
    [test-name]
    (try
    (case test-name
      "null-pointer-test" (null-pointer-test \.)
      "illegal-argument-test" (illegal-agument-test "foo")
      "stack-overflow-test" (stack-overflow-test 1)
      "macro-test" (infix-macro-test (1 / 0)))
    (catch Exception e (println e)))
    (recur (read-line)))
```

Click to set a breakpoint

🔥 At moment of event

Exception message	Divide by zero
this	core$_main$fn__27 ▾
__methodImplCache	null
System hashcode	id: 120092690
test_name	null

Macros?

Threads?

Threads?

NOPE!

GC Analysis?

Kinda…

Takipi   Events

2 VMs on 1 Machine   Settings   Dmitriy Pariyskiy, Logout

GC Analysis   Now   Server: WebDevVM (PID: 28137)   11 GCs   Average: 38 ms

Longest

228 ms	12:47pm	MapEntry
83 ms	12:07pm	No data available
38 ms	12:07pm	No data available
13 ms	12:07pm	No data available
11 ms	12:07pm	No data available

225 ms
200 ms
175 ms
150 ms
125 ms
100 ms
75 ms
50 ms
25 ms

12:07pm   12:17pm   12:27pm   12:37pm   12:47pm

Jul 17, 12:17 pm   2 most common allocations

MapEntry - clojure.lang.MapEntry   ~11.74%

PersistentHashMap$BitmapIndexedNode - clojure.lang.PersistentHash...   ~5.06%

MultiFn.getFn
MultiFn.getMethod
MultiFn.findAndCacheBestMethod
MultiFn.isA
Var.invoke
core$isa_QMARK_.invoke
core$some.invoke
core$first.invoke
RT.first
APersistentMap$KeySeq.first
PersistentHashMap$NodeSeq.first
PersistentHashMap$NodeSeq.first

Click to set a breakpoint

`clojure.lang.PersistentHashMap$NodeSeq`

```
        super(meta);
        this.array = array;
        this.i = i;
        this.s = s;
    }

    public Obj withMeta(IPersistentMap meta) {
        return new PersistentHashMap$NodeSeq(meta, this.array, this.i, this.s);
    }

    public Object first() {
        if(this.s != null) {
            return this.s.first();
        } else {
            return new MapEntry(((Object[])this.array)[this.i], ((Object[])this.array)[this.i + (1)]);
        }
    }

    public ISeq next() {
        if(this.s != null) {
            return create(this.array, this.i, this.s.next());
        } else {
            return create(this.array, this.i + (2), (ISeq)null);
        }
    }

    // $FF: synthetic method
    // $FF: bridge method
```

GC Analysis?

https://app.takipi.com/index.html?serviceId=S1362&requestId=138&hitId=0

93 Events

New Breakpoint ▼

Where	Line [29] (catch Exception e (println e)))
Variables	e
Condition	Set a condition (optional), for example: ((user.name.equals(john))&&(user.id==1))

Learn more about breakpoints   Cancel   Set Point

121 | GC Analysis   14.32
Server: WebDevVM (PID: 28137)   Following

Today

138 | Server Breakpoint   17:08
core$_main$fn__27.invoke   Following

137 | IllegalArgumentException   16:51
core$_main$fn__27.invoke   Following

136 | ArithmeticException   16:49
core$_main$fn__27.invoke   Following

20 | ArithmeticException   16:28
Numbers.divide   Following

135 | IllegalArgumentException   16:19
core$illegal_agument_test.invoke   Following

134 | NullPointerException Processing...   16:19
core$null_pointer_test.invoke   Following

133 | IllegalArgumentException   16:05
core$_main$fn__27.invoke   Following

131 | NullPointerException   15:41
Compiler.eval   Following

75 | MalformedURLException   15:39
io$fn__8652.invoke   Following

129 | ClassNotFoundException   15:27
RT.classForName   Following

tkptest.core$_main$fn__27

```clojure
(ns tkptest.core
    (:gen-class))

(defmacro infix-macro-test [form]
    (list (second form) (first form) (nth form 2)))

(defn null-pointer-test [chr]
    (doseq [x '(1 2 3 4)]
        ((println x)
         (println chr))))

(defn illegal-agument-test [mystr]
  (case mystr
        "" 0
        "hello" (count mystr)))

(defn stack-overflow-test [count]
    (print ".")
    (stack-overflow-test (inc count)))


(defn -main
    [test-name]
    (try
    (case test-name
      "null-pointer-test" (null-pointer-test \.)
      "illegal-argument-test" (illegal-agument-test "foo")
      "stack-overflow-test" (stack-overflow-test 1)
      "macro-test" (infix-macro-test (1 / 0)))
    (catch Exception e (println e)))
    (recur (read-line))))
```

Breakpoints?
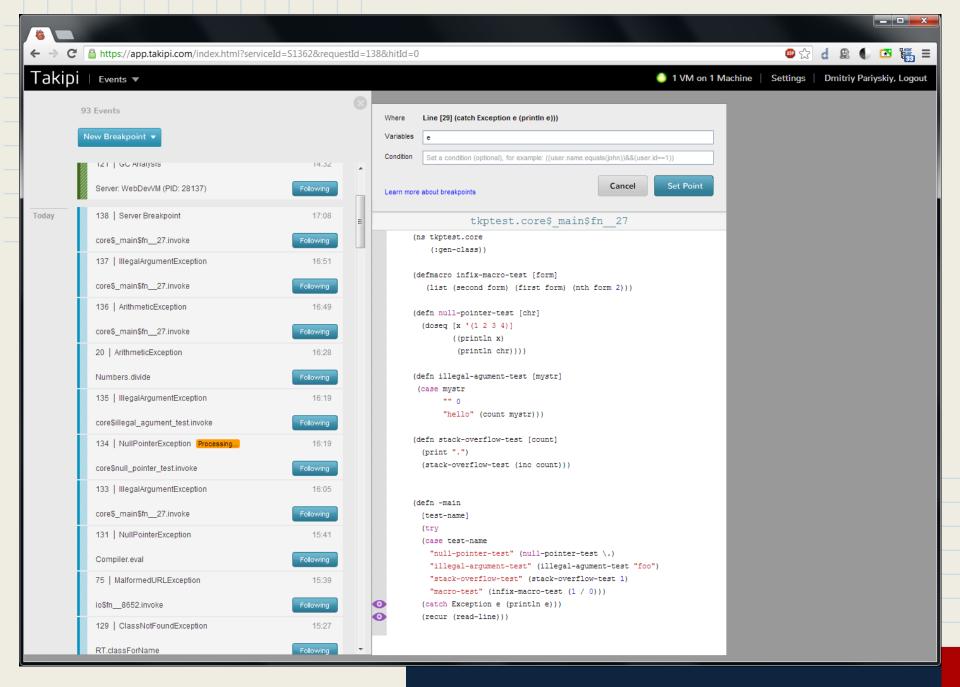
Summary

- VERY ALPHA (for Clojure)

- DO NOT USE IN PRODUCTION

- May want to use on a CI server or Test box

- May want to use on local machine

- Currently most useful for tracking down java library issues

- For Clojure, some features work, some partially work, some don't work at all

Further Studies

- Run for a while on a big application

- See clojure source without compiling or :gen-class

- Figure out good Takipi library settings

- Talk to Takipi team about first-class clojure support

Common Issues

- Not Connecting
  - Firewall? Service running?
  - Network connection?

- Leiningen Crashing
  - `killall takipi-agent; /etc/init.d/takipi restart`

- Not catching exceptions
  - Top packages set correctly?
  - VM terminating too soon?

- Forever "Processing"
  - Network connection?
  - Retry

Thank You!

Questions

github.com/ispolin/takipi-notes