

Lessons learned implementing ChatOps (DevOps + messaging)

Corey Hulen / Co-founder and CTO, Mattermost, Inc.
March 2020

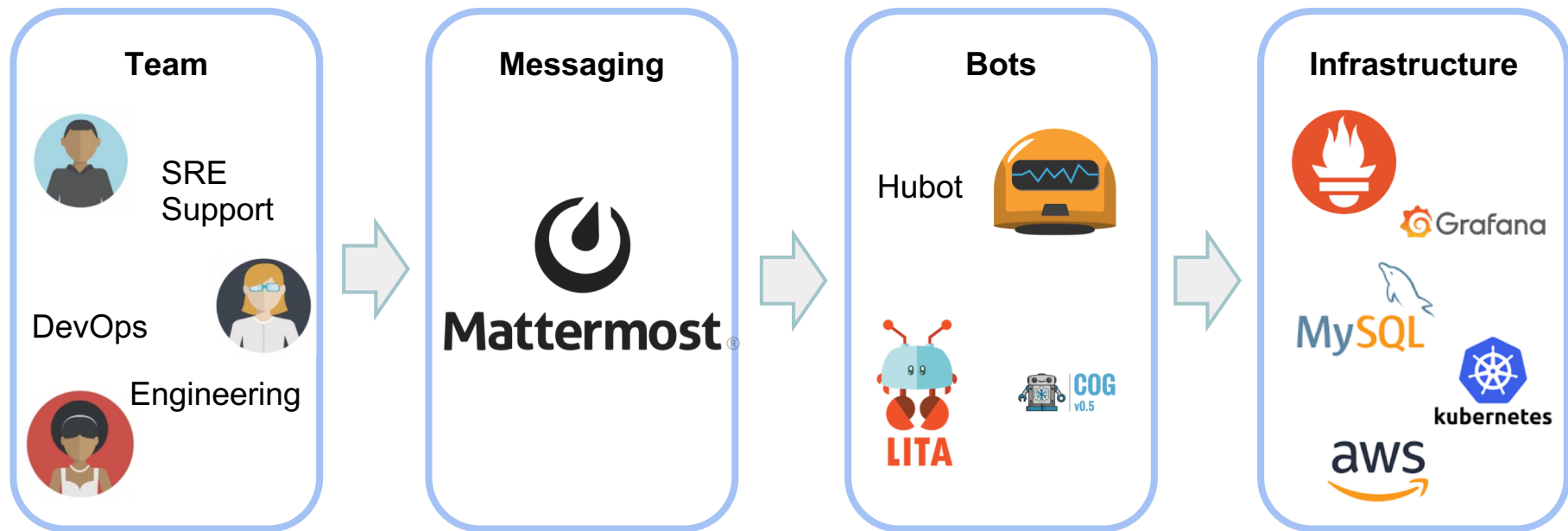
What is ChatOps?

ChatOps is a collaborative, conversation-centric way of working that brings people, discussions, bots, tools and files together in one central location

Benefits of ChatOps

- Shorten the feedback loop (Faster time to response)
- It is a shared console or command line
- It captures the history
- All the required people in one place
- Mean time to restore drops dramatically
- **It's a methodology not a technology**

Ideal World of ChatOps



****Reality - most are not that sophisticated, but even the smallest steps add value!**

**That's great, but how do we
get there?**

Step 1 - Start Small, do it manually for a bit

- Are you a chat based organization?
- Start by getting all the humans into a channel based chat system
- Channel base communication is key to incident response
- It's a shared screen - think of it like a cooperative board game
- It captures the history of everything everyone has tried
- Don't be afraid to over add people to start
- Your team has a lot of esoteric knowledge that can be valuable while troubleshooting

Team Coop Solving a Problem Manually



Sudheer Timmaraju 1:27 AM

... 😊 ↩ 2

Hey @patniharshit. . Screenshot here does not capture error log. Mind checking your log again about the errors and posting it?

It says the build failed but does not capture the reason of the failure to help you out.








patniharshit 1:45 AM

```
0 info it worked if it ends with ok
1 verbose cli [ '/usr/local/bin/node', '/usr/local/bin/npm', 'run', 'build' ]
2 info using npm@6.4.1
3 info using node@v11.0.0
4 verbose run-script [ 'prebuild', 'build', 'postbuild' ]
5 info lifecycle mattermost-webapp@0.0.1~prebuild: mattermost-webapp@0.0.1
6 info lifecycle mattermost-webapp@0.0.1~build: mattermost-webapp@0.0.1
7 verbose lifecycle mattermost-webapp@0.0.1~build: unsafe-perm in lifecycle true
8 verbose lifecycle mattermost-webapp@0.0.1~build: PATH: /usr/local/lib/node_modules/npm/node_modules/npm-
lifecycle/node-gyp-bin:/home/patniharshit/go/src/github.com/mattermost/mattermost-
webapp/node_modules/.bin:/usr/local/cuda-
8.0/bin:/home/patniharshit/bin:/home/patniharshit/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bi
n:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:$/home/Documents/Nim/bin:/usr/local/go/bin:/home/patnihars
hit/go/bin:/usr/local/go/bin
9 verbose lifecycle mattermost-webapp@0.0.1~build: CWD:
/home/patniharshit/go/src/github.com/mattermost/mattermost-webapp
10 silly lifecycle mattermost-webapp@0.0.1~build: Args: [ '-c',
10 silly lifecycle 'cross-env NODE_ENV=production webpack --display-error-details --verbose' ]
```


Step 2 - Automate the Simple Things


- You don't need to start with an uber powerful bot that solves every problem
- Automate simple alerts piping them into a channel
- Create specific channels for the different alerts
 - Security
 - Performance
 - Build System
 - War rooms
- Use simple webhooks to get you started
- Watch your team cooperatively respond
 - How often does the left hand not know what the right hand is doing?


Solving a problem from a simple Webhook



**alert** 11:48 AM    2

ALARM: "corp-mattermost-CPU-Utilization" in US East (N. Virginia)
[#aws-notification-alert](#) on Sat, 3 Nov 2018 18:45:57 +0000
You are receiving this email because your Amazon CloudWatch Alarm "corp-mattermost-CPU-Utilization" in the US East (N. Virginia) region has entered the ALARM state, because "Threshold Crossed: 1 datapoint [82.4641844956938 (03/11/18 18:40:00)] was greater than or equal to the threshold (50.0)." at "Saturday 03 November, 2018 18:45:57 UTC".
View this alarm in the AWS Management Console:
<https://console.aws.amazon.com/cloudwatch/home?region=us-east-1#s=Alarms&alarm=corp-mattermost-CPU-Utilization>
Alarm Details:
• Unit: not specified

 Show More

**Carlos Panato** 12:04 PM
[@Martin Kraft](#)

**System** 12:04 PM
[@Martin Kraft](#) added to the channel by [@Carlos Panato](#).

**Martin Kraft** 12:07 PM  2
Commented on [alert's](#) message: **ALARM: "corp-mattermost-CPU-Utilization" in US East (N. Virginia) #aws-notification-alert** on Sat, 3 Nov 2018...
I am doing a lot of requests right now.

Step 3 - Automate the Harder Things

- Starting adding advance slash commands or alerting hooks
- Bring in Richer Data
- More than Screenshots
- Markdown Tables
- File attachments for logs
- Markdown formatting

Example of Rich Markdown Table

Loadtest Results

Score: 71.48 (+24.66, relative to baseline)

The score is the average of the 95th percentile, median and interquartile ranges in the routes below.

Routes

GET /channels/[channel id]/members

| Metric | Baseline | Actual | Delta | Delta % |
|----------------------|----------|--------|---------|---------|
| Hits | 1515 | 1455 | -60 | -3.96% |
| Error Rate | 0.00% | 0.00% | 0% | 0% |
| Mean Response Time | 4.91ms | 2.69ms | -2.22ms | -45.16% |
| Median Response Time | 4.00ms | 2.00ms | -2.00ms | -50.00% |
| 95th Percentile | 8.00ms | 5.00ms | -3.00ms | -37.50% |

Example of Rich messages and log files



jira BOT 12:31 PM

Harrison Healey created Bug MM-13014

Web: Sometimes tries to load posts before current cha

Repro steps (may be inconsistent):

- 1) Open Mattermost in a DM channel
- 2) Observe the JS console and server logs

Observed: The client requests `/api/v4/channels/undefi`
goes out shortly after with the correct channel ID (seco

image-2018-11-13-15-30-54-798.png|thumbnail!

image-2018-11-13-15-30-54-798.png|thumbnail!



Corey Hulen 1:47 PM

Attaching nginx log for bug report



nginx.txt

TXT 7KB



```
1 93.180.71.3 - - [17/May/2015:08:05:32 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
2 93.180.71.3 - - [17/May/2015:08:05:23 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
3 80.91.33.133 - - [17/May/2015:08:05:24 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.17)"
4 217.168.17.5 - - [17/May/2015:08:05:34 +0000] "GET /downloads/product_1 HTTP/1.1" 200 490 "-" "Debian APT-HTTP/1.3 (0.8.10.3)"
5 217.168.17.5 - - [17/May/2015:08:05:09 +0000] "GET /downloads/product_2 HTTP/1.1" 200 490 "-" "Debian APT-HTTP/1.3 (0.8.10.3)"
6 93.180.71.3 - - [17/May/2015:08:05:57 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
7 217.168.17.5 - - [17/May/2015:08:05:02 +0000] "GET /downloads/product_2 HTTP/1.1" 404 337 "-" "Debian APT-HTTP/1.3 (0.8.10.3)"
8 217.168.17.5 - - [17/May/2015:08:05:42 +0000] "GET /downloads/product_1 HTTP/1.1" 404 332 "-" "Debian APT-HTTP/1.3 (0.8.10.3)"
9 80.91.33.133 - - [17/May/2015:08:05:01 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.17)"
10 93.180.71.3 - - [17/May/2015:08:05:27 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
11 217.168.17.5 - - [17/May/2015:08:05:12 +0000] "GET /downloads/product_2 HTTP/1.1" 200 3316 "-" "-"
12 188.138.60.101 - - [17/May/2015:08:05:49 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
13 80.91.33.133 - - [17/May/2015:08:05:14 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.16)"
14 46.4.66.76 - - [17/May/2015:08:05:45 +0000] "GET /downloads/product_1 HTTP/1.1" 404 318 "-" "Debian APT-HTTP/1.3 (1.0.1ubuntu2)"
15 93.180.71.3 - - [17/May/2015:08:05:26 +0000] "GET /downloads/product_1 HTTP/1.1" 404 324 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
16 91.234.194.89 - - [17/May/2015:08:05:22 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
17 80.91.33.133 - - [17/May/2015:08:05:07 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.17)"
18 37.26.93.214 - - [17/May/2015:08:05:38 +0000] "GET /downloads/product_2 HTTP/1.1" 404 319 "-" "Go 1.1 package http"
19 188.138.60.101 - - [17/May/2015:08:05:25 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
20 93.180.71.3 - - [17/May/2015:08:05:11 +0000] "GET /downloads/product_1 HTTP/1.1" 404 340 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
21 46.4.66.76 - - [17/May/2015:08:05:02 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (1.0.1ubuntu2)"
22 62.75.198.179 - - [17/May/2015:08:05:06 +0000] "GET /downloads/product_2 HTTP/1.1" 200 490 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
23 80.91.33.133 - - [17/May/2015:08:05:55 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.16)"
24 173.203.139.108 - - [17/May/2015:08:05:53 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
25 210.245.80.75 - - [17/May/2015:08:05:32 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (1.0.1ubuntu2)"
26 46.4.83.163 - - [17/May/2015:08:05:52 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
27 91.234.194.89 - - [17/May/2015:08:05:18 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
28 31.22.86.126 - - [17/May/2015:08:05:24 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.16)"
29 217.168.17.5 - - [17/May/2015:08:05:25 +0000] "GET /downloads/product_1 HTTP/1.1" 200 3301 "-" "-"
30 80.91.33.133 - - [17/May/2015:08:05:50 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.22)"
31 173.203.139.108 - - [17/May/2015:08:05:03 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
32 80.91.33.133 - - [17/May/2015:08:05:35 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.16)"
33 5.83.131.103 - - [17/May/2015:08:05:51 +0000] "GET /downloads/product_1 HTTP/1.1" 200 490 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.22)"
34 80.91.33.133 - - [17/May/2015:08:05:59 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.17)"
35 200.6.73.40 - - [17/May/2015:08:05:42 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
36 80.91.33.133 - - [17/May/2015:08:05:48 +0000] "GET /downloads/product_1 HTTP/1.1" 404 324 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.17)"
37 93.180.71.3 - - [17/May/2015:08:05:18 +0000] "GET /downloads/product_1 HTTP/1.1" 404 337 "-" "Debian APT-HTTP/1.3 (0.8.16-exp12ubuntu10.21)"
38 62.75.198.179 - - [17/May/2015:08:05:39 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
39 50.57.209.92 - - [17/May/2015:08:05:41 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
40 188.138.60.101 - - [17/May/2015:08:05:48 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
41 46.4.66.76 - - [17/May/2015:08:05:02 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (1.0.1ubuntu2)"
42 50.57.209.92 - - [17/May/2015:08:05:25 +0000] "GET /downloads/product_1 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
43 91.239.186.133 - - [17/May/2015:08:05:04 +0000] "GET /downloads/product_2 HTTP/1.1" 304 0 "-" "Debian APT-HTTP/1.3 (0.9.7.9)"
```

Step 4 - Start Automating Command and Control

- Start off simple with outgoing webhooks and slash commands
- Automate the things you find your teammates constantly bugging someone todo
- Allow self provisioning by most anyone
- Trust the automation to keep them on the rails (They shouldn't be able to screw it up)
- Examples
 - Setup adhoc testing environments
 - Setup load testing environments
 - Query detailed analytics systems
- Automate deploys to production, why?
 - Nice history of what went wrong, anyone/everyone can help out

Matterbuild example



cpanato 21:18

ok

for 5.5: [pr-mattermost-server-9799](#)

for master: [pr-mattermost-server-9798](#)

/mb cut 5.5.0-rc1



Matterbuild BOT 11:12



Matterbuild

Cut Release

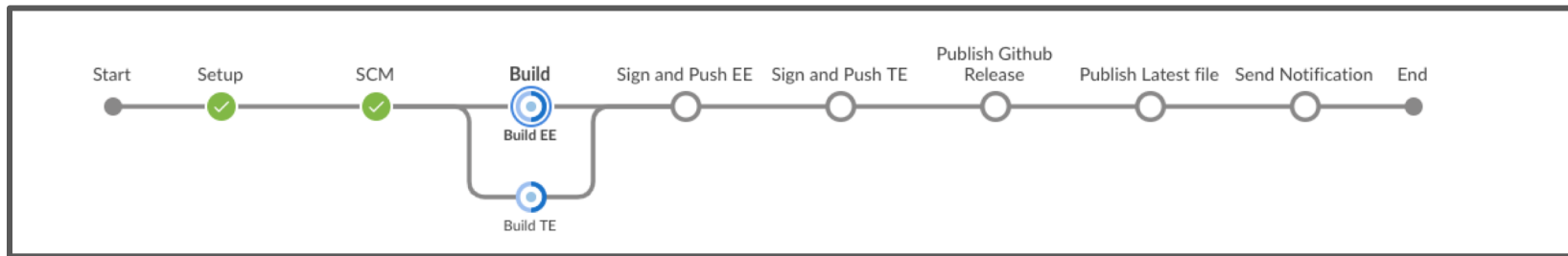
Release 5.5.0-rc1 is on the way.



Mattermost Release BOT 11:15

Release 5.5.0-rc1 has started building.

Matterbuild example cont.



Mattermost Release BOT 11:31

Release 5.5.0-rc1 Download Links

Enterprise Edition

Link: <https://releases.mattermost.com/5.5.0-rc1/mattermost-5.5.0-rc1-linux-amd64.tar.gz>

MD5 Hash: fb4de8056158ad434039b3ed47355eee

SHA-1 Hash: e8a30a06f10d4067e462ed64b916fd5156692a71

SHA-256 Hash: a3cd23cdd6c33491b94117a08082def15e03869b58955896f1dc83e6199d2a29

Team Edition

Link: <https://releases.mattermost.com/5.5.0-rc1/mattermost-team-5.5.0-rc1-linux-amd64.tar.gz>

MD5 Hash: 558bd75e0973dd6c995140697bb1e7a8

SHA-1 Hash: 5ec0df2d3544ea275c978ab1f43f0c1b451b7572

SHA-256 Hash: 2b0d6d2b93f71e9a16f21d2814ef955e84ff71ae081876c0767513d8ec9ede96

Testing Server

<https://rctest.reddogsofwar.com>


GPG Signatures


Key: A1B31D46F0F3A10B02CF2D44F8F2C31744774B28

EE Signature: <https://releases.mattermost.com/5.5.0-rc1/mattermost-5.5.0-rc1-linux-amd64.tar.gz.sig>

TE Signature: <https://releases.mattermost.com/5.5.0-rc1/mattermost-team-5.5.0-rc1-linux-amd64.tar.gz.sig>

Matterbuild example cont.

 **Matterbuild BOT** 11:03 (Visível somente para você)

 **Matterbuild**
Information
Control of the build system though MM slash commands!

Usage:
matterbuild [command]

Available Commands:
cut Cut a release of Mattermost
cutstatus Check the status of the Cut Release Job
getpootle Check the branches set in the Translation Server
help Help about any command
loadtest Create a kubernetes cluster to loadtest a branch or pr.
lockpootle Lock the Translation server for a particular release Branch
merge Merge the specified release branch to master and create the pull request
runjob Run a job on Jenkins.
seeconf Dump the configuration of a build job.
setci Set the branch target for the CI servers.
setprerelease Set the target for pre-release.

Use "matterbuild [command] --help" for more information about a command.

Step 5 - Bot It Up!

- Take all the great work you've done previous steps and start converting it to a more human interface
- I don't know about you, but I have a hard time remembering slash commands and all their parameters (who reads the help??)
- Give it some character, make it fun!
 - Make it angry
 - Or overly happy
 - Humanize it to reach a larger audience
 - Gives you someone to blame. "The angry bot did it, not me!"
- Use existing bot interfaces like Hubot
 - - Jenkins
 - - show server logs for various test servers
 - - show grafana reports

Hubot Example

 Corey Hulen 9:34 AM
hubot lets ship it

 hubot 9:34 AM
✂ <http://shipitsquirrel.github.io/images/ship%20it%20squirrel.png>



NATIONAL GEOGRAPHIC
Photograph by Melissa Branetti, Your Shot
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Step 6 (Optional) - Build Rich Plugins and Bots

- Utilize the rich plugin framework to build deep integration widgets (Mattermost Only)
- Both frontend and backend plugins
- Intercept messages before they are entered into chat and after they are entered into chat

Github Integration

Tue, Nov 13, 2018

Dean Whillier

Elias Nahum

Elliott Noel

Eric Sethna

4 Eric Sethna, Jason Blais,...

Erik Sundell

Firsty McLasty

George Goldberg

github

Hanna Park

2 Hanna Park, scottleeda...

Switch Channels - %K

GitHub Plugin BOT 11:01 AM

Unread Messages

You have 1 unread messages:

- pr-mattermost-server-1351

Review Requests

You have don't have any pull requests awaiting your review.

Your Open Pull Requests

You have don't have any open pull requests.

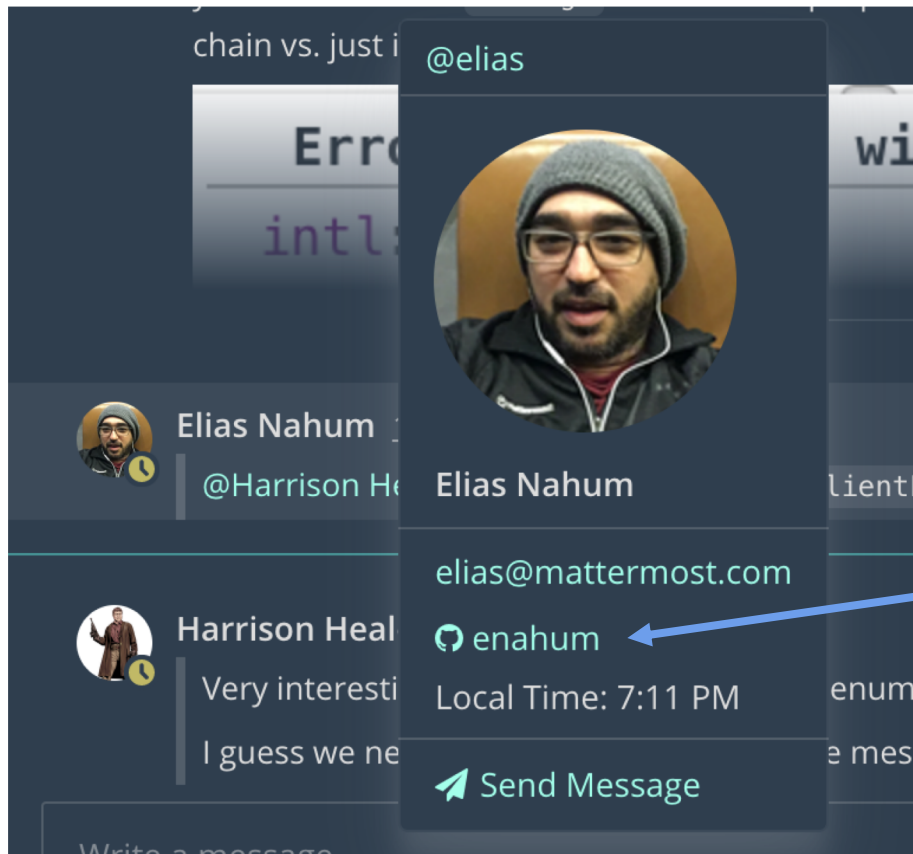
Your Assignments

You have don't have any assignments.

Write a message...

Your open pull requests

Github Integration Cont.



Jira Integration

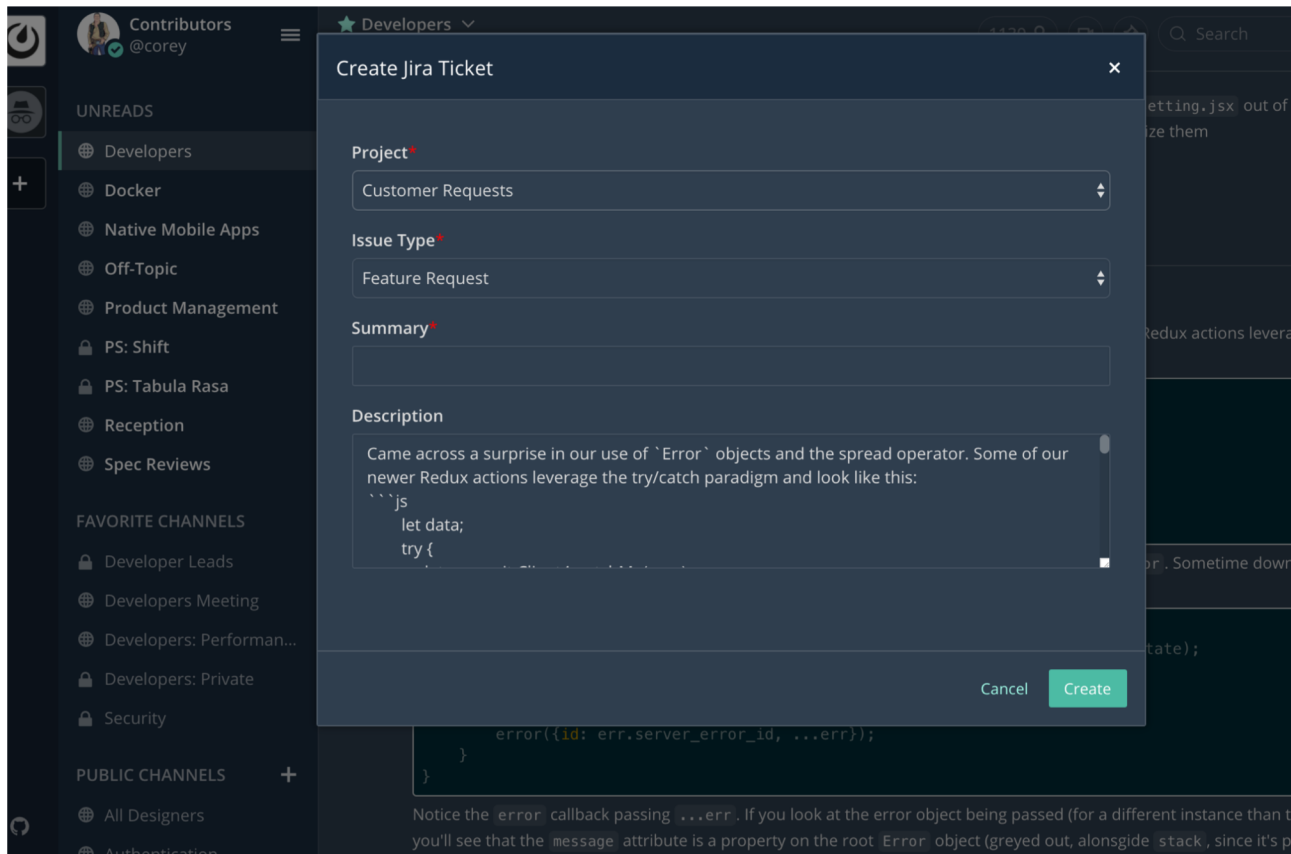
The screenshot displays a Mattermost chat window. On the left is a sidebar with a list of channels: Developers, Docker, Native Mobile Apps, Off-Topic, Product Management, PS: Shift, PS: Tabula Rasa, Reception, and Spec Reviews. Below these are 'FAVORITE CHANNELS' including Developer Leads, Developers Meeting, and Developers: Performan... The main chat area shows a message from George Goldberg at 1:18 PM: "/cc @George Goldberg (in case there's overlap of efforts here)". A date separator indicates "Tue, Nov 13, 2018". Below this is a message from Jesse Hallam at 10:55 AM: "Came across a surprise in our use of `Error` objects and the spread operator. Some of our newer Redux action paradigm and look like this:". The message includes a code block with JavaScript code:

```
let data;
try {
  data = await Client4.patchMe(user);
} catch (error) {
  dispatch({type: UserTypes.UPDATE_ME_FAILURE, error}, getState);
  return {error};
}
```

 A blue arrow points from the code block to a context menu that appears when the code is selected. The menu options are: Reply, Permalink, Pin to channel, Delete, Edit, and Create Jira Issue. Below the code block, the text continues: "When an error occurs, the returned object contains an `error` field with an instance of `ClientError`. Sometime down the line, we might do something like this (using our old action styles):". Another code block follows:

```
export async function updateUser(user, success, error) {
  const {data, error: err} = await UserActions.updateMe(user)(dispatch, getState);
```

Jira Integration Cont.



Step 7 - Nirvana, Bots talking to Bots?? :)

- Some customers are generating 50% of their traffic from bots
- Some customers have a war room that looks like reading the matrix
- Message scrolling faster than a human can read, why?
- Bots are watching the war room, pulling data out into other channels where humans process the information then bots put the info back in the war room channel
- War room is acting like an app message bus at this point, but it gives everyone a common interface

Questions?

How to reach me?

- Twitter: @corey_hulen
- Email: corey@hulen.com
- Mattermost: @corey on <https://community.mattermost.com>