

mXpress

Scrum 3

By Team MX

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mXpress Emergency Vehicle Routing System



Solving slow emergency response times in large cities



Fills the need for high quality, specialized routing systems for emergency dispatchers



Innovates by utilizing both batch and stream big data coupled with AI to do predictive and reactive trip planning



Potentially allows for consumer vehicle routing using batch data



Adaptable framework allows for multiple qualities of service provided



Spark Master at spark://master1:7077

URL: spark://master1:7077

Alive Workers: 3

Cores in use: 22 Total, 0 Used

Memory in use: 43.5 GB Total, 0.0 B Used

Applications: 0 Running, 2 Completed

Drivers: 0 Running, 0 Completed

Status: ALIVE

Workers (3)

Worker Id	Address	State	Cores	Memory
worker-20200105154514-192.168.1.130-42983	192.168.1.130:42983	ALIVE	5 (0 Used)	14.5 GB (0.0 B Used)
worker-20200105154602-192.168.1.136-41081	192.168.1.136:41081	ALIVE	12 (0 Used)	14.5 GB (0.0 B Used)
worker-20200105154830-192.168.1.180-42971	192.168.1.180:42971	ALIVE	5 (0 Used)	14.5 GB (0.0 B Used)

Running Applications (0)

Application ID	Name	Cores	Memory per Executor	Submitted Time	User	State	Duration
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Completed Applications (2)

Application ID	Name	Cores	Memory per Executor	Submitted Time	User	State	Duration
app-20200105155318-0001	Spark Pi	22	1024.0 MB	2020/01/05 15:53:18	spark_1	FINISHED	1.8 min
app-20200105154450-0000	Spark shell	0	1024.0 MB	2020/01/05 15:44:50	spark_2	FINISHED	14 s

- Fully functional Spark & Hadoop cluster, OSRM, and Kafka servers
- More detailed documentation
- Mapped sensors to geographic position
- Fixed everything!

Project Progress

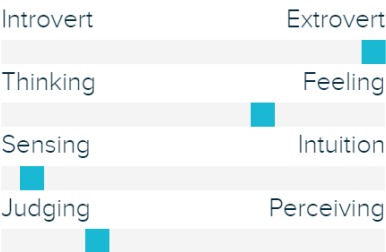
Emmy the EMS Tech



"I didn't even want a cell phone until last year!"

Age: 48
Work: EMS Tech
Family: Single, 3 Kids
Location: Brampton
Character: Anti-technology

Personality



Socialite

Old Fashioned

Stubborn

Goals

- To retire early
- Meet a new husband, have the kids grow up and move out
- Avoid change and continue status quo at work

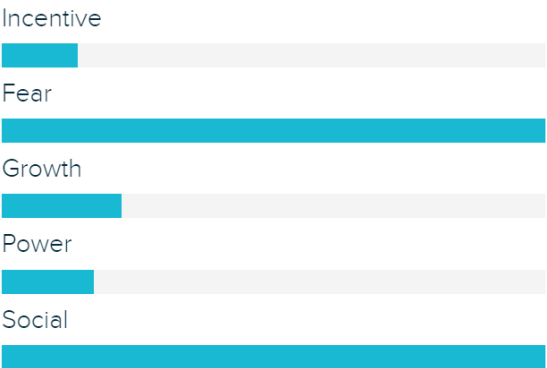
Frustrations

- Getting new glasses when her prescription changes
- Her kids insisting that she get new social media accounts
- Having to use technology instead of intuition for driving around the city

Bio

Loves her kids to death. Not great with technology. Her kids show her how to use her phone. Never used a computer outside of work. Only has experience using Windows 2000, XP and Office 2006. Frustrated with how bad her previous interactions with technology are. Wants to use the software as little as possible, has no desire to sit through weeks of training to learn how to use the routing program. Has slightly deteriorating eyesight and would benefit from a distraction free/easy to read interface.

Motivation



Adam the Ambulance Driver



"Bitcoin is the future"

Age: 22

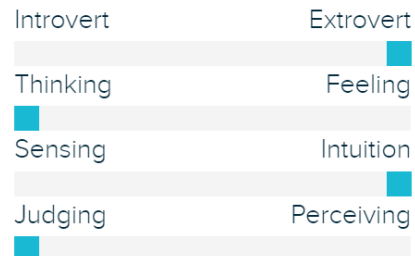
Work: EMS Tech

Family: It's Complicated

Location: Winnipeg

Character: Narcissist

Personality



Hipster

Techy

Ignorant

Power Hungry

Goals

- To become a self made millionaire
- Buy a new Mercedes
- Become World Powerlifting Champion
- Get away with doing as little work as possible while maximizing gains

Frustrations

- People who don't lift
- Cryptocurrency FUD
- Slow drivers and traffic jams
- Coffee that isn't how he ordered it

Bio

Thinks of himself as a tough guy. Prides himself on having the fastest average EMS response times in the province. Hates doing work. Wants to have a cell phone on the dashboard with the fastest updated traffic patterns so he can get places faster. Sometimes reckless, but with good intentions. Enjoys new technology, even if it hardly works.

Motivation

Incentive



Fear



Growth

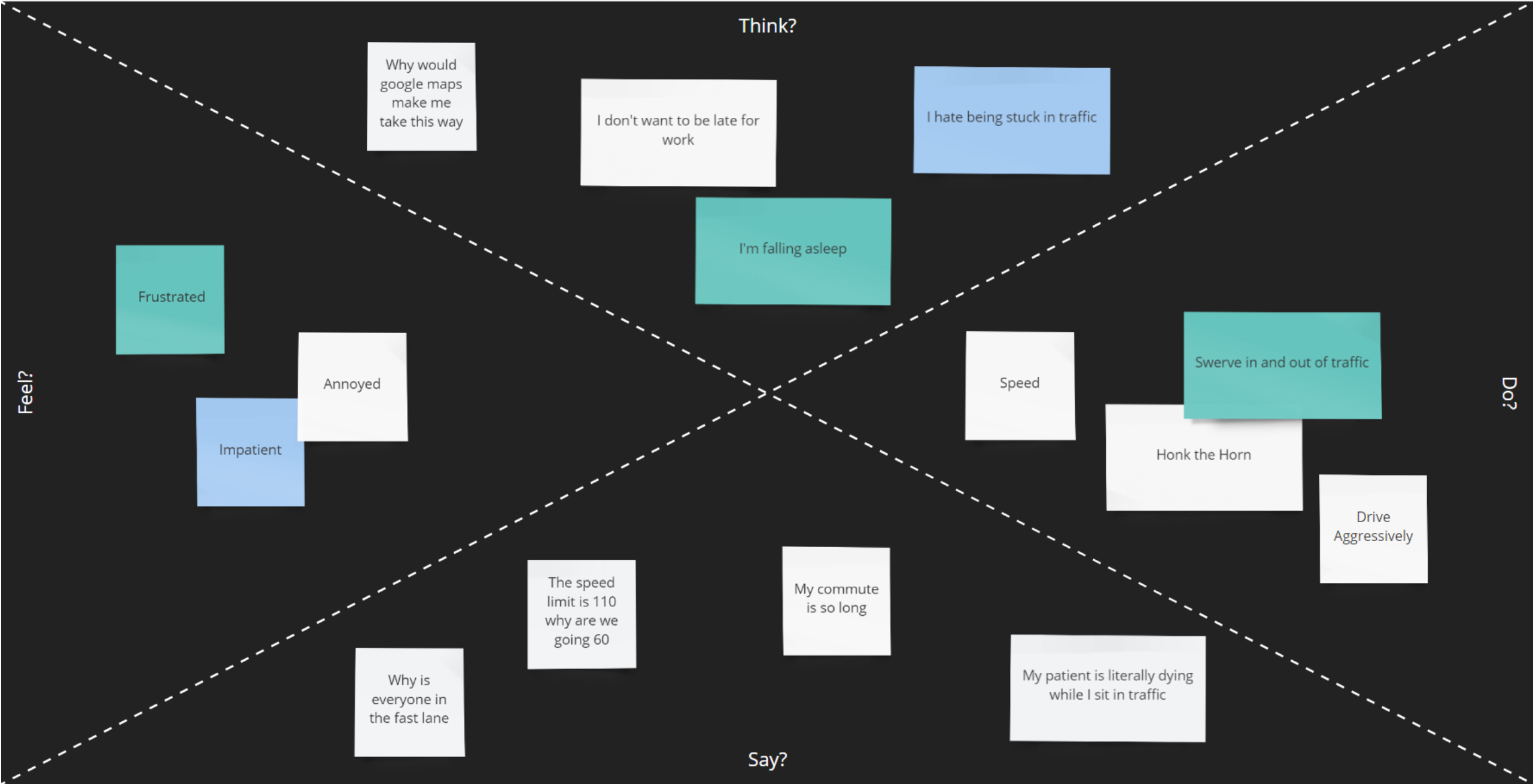


Power



Social





Next Steps

- Streaming simulation
- More advanced programming in Scala
- Output of Spark CSV -> MongoDB -> OSRM



Backbone & Testing

- 3 Node Spark Cluster
 - Distributed Compute Load
 - Multiple Execution Units
- Running Scala code on cluster
- Performance Testing
 - Ethernet Bandwidth
 - Connect/Disconnect time
 - Divide/Join time

```
spark_1@localhost:/usr/spark/spark-2.4.4-bin-hadoop2.7
File Edit View Search Terminal Tabs Help

spark_1@localhost:/usr/spark/spark-2.4.4-bin-hadoop2.7
19/10/20 13:44:00 INFO TaskSetManager: Finished task 3.0 in stage 0.0 (TID 3) in 423 ms on localhost (executor driver) (1/10)
19/10/20 13:44:00 INFO Executor: Running task 9.0 in stage 0.0 (TID 9)
19/10/20 13:44:00 INFO Executor: Running task 7.0 in stage 0.0 (TID 7)
19/10/20 13:44:00 INFO Executor: Running task 8.0 in stage 0.0 (TID 8)
19/10/20 13:44:00 INFO TaskSetManager: Finished task 1.0 in stage 0.0 (TID 1) in 442 ms on localhost (executor driver) (2/10)
19/10/20 13:44:00 INFO TaskSetManager: Finished task 4.0 in stage 0.0 (TID 4) in 444 ms on localhost (executor driver) (3/10)
19/10/20 13:44:00 INFO TaskSetManager: Finished task 0.0 in stage 0.0 (TID 0) in 472 ms on localhost (executor driver) (4/10)
19/10/20 13:44:00 INFO TaskSetManager: Finished task 2.0 in stage 0.0 (TID 2) in 447 ms on localhost (executor driver) (5/10)
19/10/20 13:44:00 INFO Executor: Finished task 6.0 in stage 0.0 (TID 6). 824 bytes result sent to driver
19/10/20 13:44:00 INFO Executor: Finished task 5.0 in stage 0.0 (TID 5). 824 bytes result sent to driver
19/10/20 13:44:00 INFO TaskSetManager: Finished task 5.0 in stage 0.0 (TID 5) in 77 ms on localhost (executor driver) (6/10)
19/10/20 13:44:00 INFO TaskSetManager: Finished task 6.0 in stage 0.0 (TID 6) in 75 ms on localhost (executor driver) (7/10)
19/10/20 13:44:00 INFO Executor: Finished task 8.0 in stage 0.0 (TID 8). 824 bytes result sent to driver
19/10/20 13:44:00 INFO TaskSetManager: Finished task 8.0 in stage 0.0 (TID 8) in 73 ms on localhost (executor driver) (8/10)
19/10/20 13:44:00 INFO Executor: Finished task 9.0 in stage 0.0 (TID 9). 824 bytes result sent to driver
19/10/20 13:44:00 INFO TaskSetManager: Finished task 9.0 in stage 0.0 (TID 9) in 76 ms on localhost (executor driver) (9/10)
19/10/20 13:44:00 INFO Executor: Finished task 7.0 in stage 0.0 (TID 7). 824 bytes result sent to driver
19/10/20 13:44:00 INFO TaskSetManager: Finished task 7.0 in stage 0.0 (TID 7) in 84 ms on localhost (executor driver) (10/10)
19/10/20 13:44:00 INFO TaskSchedulerImpl: Removed TaskSet 0.0, whose tasks have all completed, from pool
19/10/20 13:44:00 INFO DAGScheduler: ResultStage 0 (reduce at SparkPi.scala:38) finished in 0.758 s
19/10/20 13:44:00 INFO DAGScheduler: Job 0 finished: reduce at SparkPi.scala:38, took 0.834029 s
Pi is roughly 3.141779141779142
19/10/20 13:44:00 INFO SparkUI: Stopped Spark web UI at http://192.168.1.136:4040
19/10/20 13:44:00 INFO MapOutputTrackerMasterEndpoint: MapOutputTrackerMasterEndpoint stopped!
19/10/20 13:44:00 INFO MemoryStore: MemoryStore cleared
19/10/20 13:44:00 INFO BlockManager: BlockManager stopped
19/10/20 13:44:00 INFO BlockManagerMaster: BlockManagerMaster stopped
19/10/20 13:44:00 INFO OutputCommitCoordinator$OutputCommitCoordinatorEndpoint: OutputCommitCoordinator stopped!
19/10/20 13:44:00 INFO SparkContext: Successfully stopped SparkContext
19/10/20 13:44:00 INFO ShutdownHookManager: Shutdown hook called
19/10/20 13:44:00 INFO ShutdownHookManager: Deleting directory /tmp/spark-b01ef10d-2a57-4f6b-bb6f-c314444e40fd
19/10/20 13:44:00 INFO ShutdownHookManager: Deleting directory /tmp/spark-1e2bb37f-b14f-410d-9402-98b3c06edcc3
[root@localhost spark-2.4.4-bin-hadoop2.7]#
```




Group Reflection

- Do you feel you are on track?
 - Yes, but some technical issues slowed down progress. Next 2 weeks have lots of plans to program further
- Do you feel there are barriers to your success (if any)?
 - Architecture Convolutions (DB's)
 - Enterprise grade hardware requirements – Execution units/RAM
- Do you need any help going forward?
 - Nope
- Any other questions or concerns?
 - Nope