



IoT REALIZED
CONNECTED C

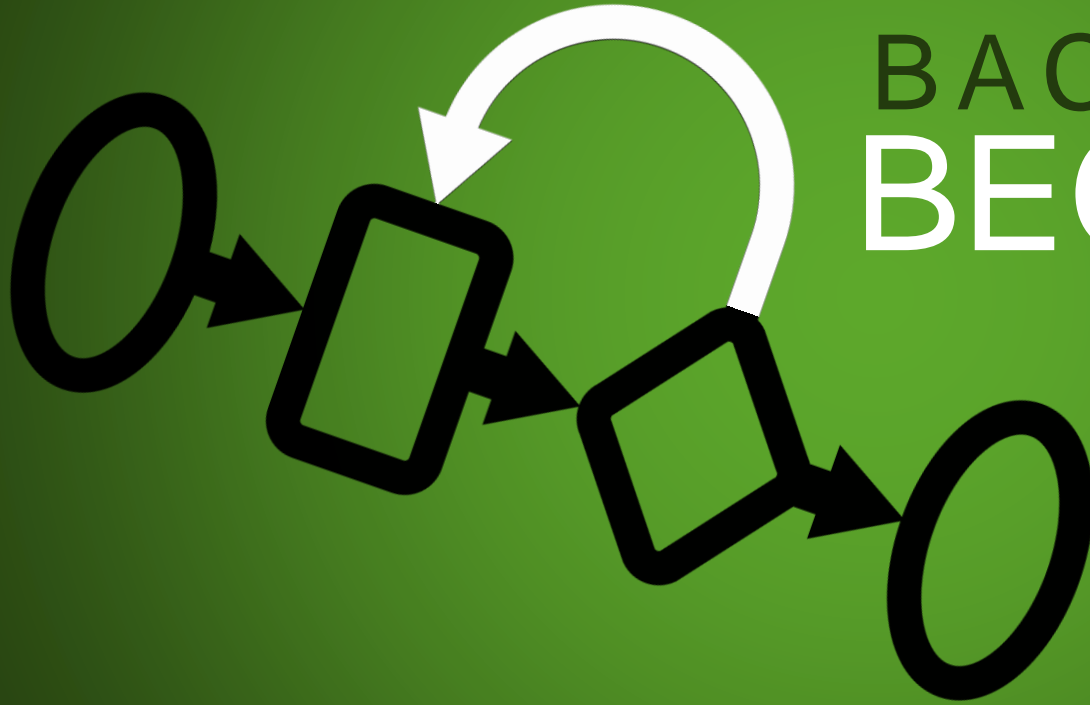




THANKS!



BACK TO THE
BEGINNING





REALLY COOL IoT PROJECT



COVERED BY AN
NDA





CONNECTED
CAR



PIECES ARE THE
SAME



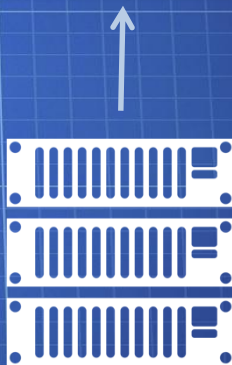
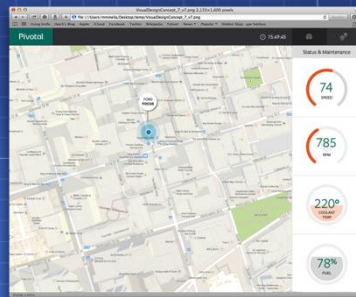
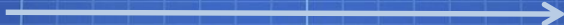
IoT IS NOT ABOUT
REFRIGERATOR



1% ^{IS A} BIG DEAL

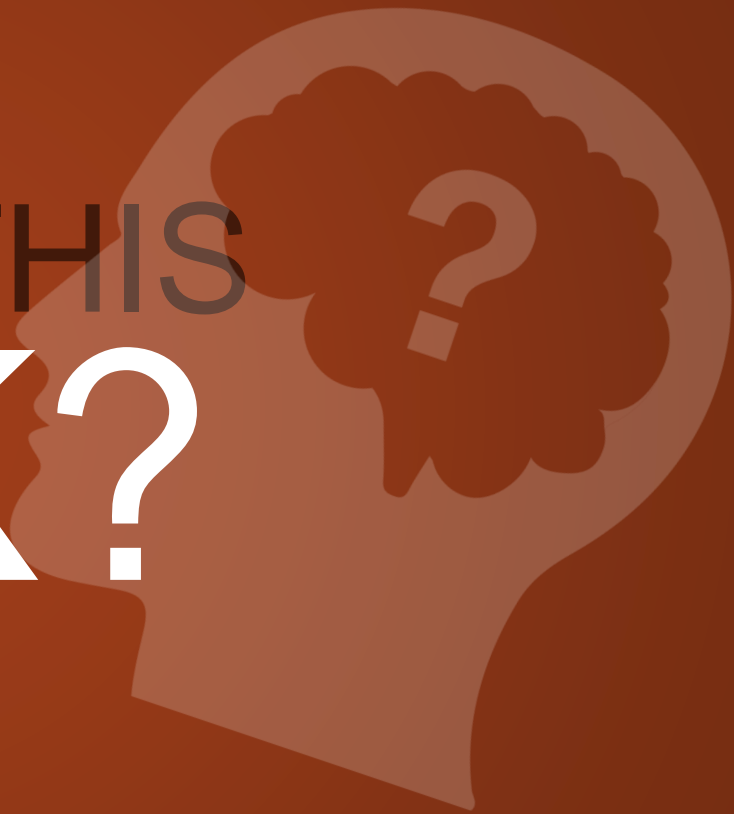


CONNECTED
CAR



ON AIR

HOW DOES THIS
WORK?



START IN THE CAR





ON BOARD DIAGNOSTICS

OBD II

01 0D

01 0D

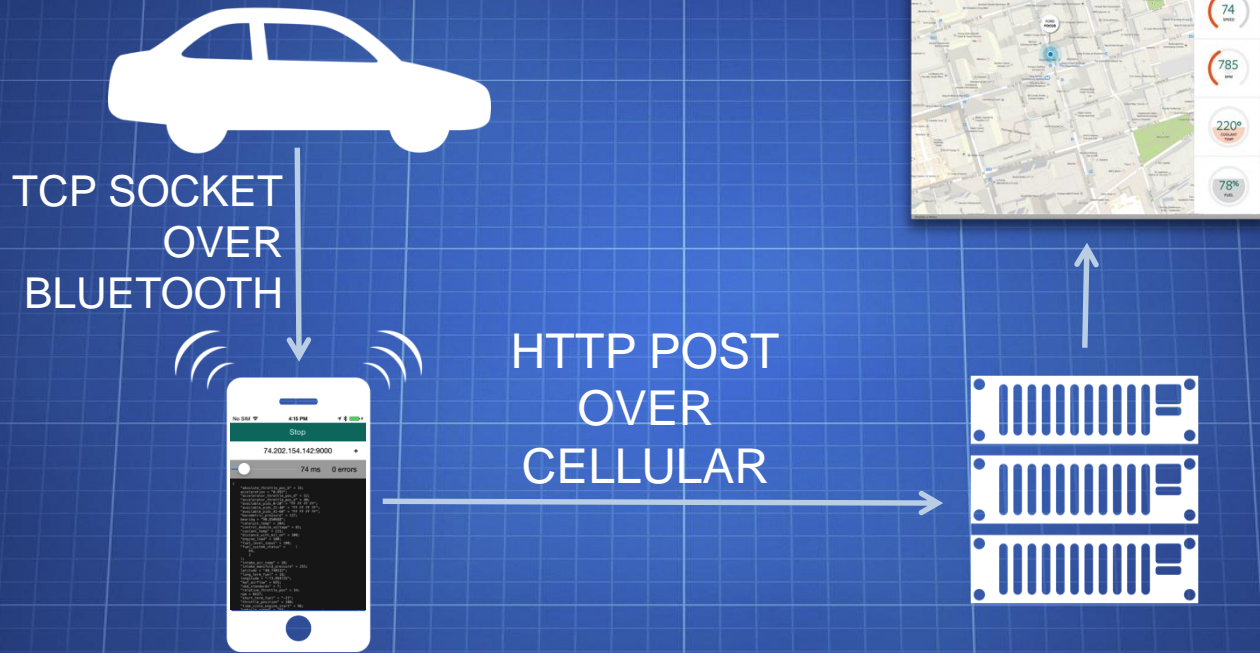
18 DA F1 11 03 41 0D 30

>

```
/**  
 * Performs the domain transformation into an acme motors specific domain  
 *  
 * @author gfoster  
 */  
public class AcmeMotorEnrichingTransformer implements Transformer{
```

```
    @Bean  
    public Message<?> transform(final Message<?> message) {  
        final Object payload = message.getPayload();  
        Map<String, Object> = new HashMap<>();  
        try {  
            if (payload != null) {  
                map = mapper.readValue(payload.toString(), Map.class);  
                map.put("timestamp", System.currentTimeMillis());  
                map.put("guid", UUID.randomUUID());  
            }  
        }  
    }  
}
```







ON THE SERVER

The Spring XD logo is a large, stylized 'X' inside a circle, rendered in a light green color. It is positioned in the upper right quadrant of the slide, behind the main text.

SPRING XD

EXTREME DATA



DISTRIBUTED RUNTIME





STREAMING & BATCH

java

XD Shell 1.0.0.M7 (java)

1- XD Shell

Spring XD

Michael's-MacBook-Pro-2:bin mminella\$./xd-shell

(-)

Spring XD

News

Popular

Hidden Skyp...ype Smileys

STREAMS

JOBS



















ABOUT

to executions and provides the control to restart the job execution (if restartable).

ments

Executions

Quick filter

	Execution Id	Job Start Time	Step Executions Count	Status	Actions
	6	2014-07-14 16:39:18	1	COMPLETED	  
	5	2014-07-14 16:38:34	1	COMPLETED	  
	4	2014-07-14 16:38:06	1	FAILED	  
	3	2014-07-14 16:37:34	1	FAILED	  
import	2	2014-07-14 16:36:06	1	COMPLETED	  
import	1	2014-07-14 16:34:20	4	COMPLETED	  

eXtreme Data

1.0.0.M7 | Admin Server Target: http://localhost:8080

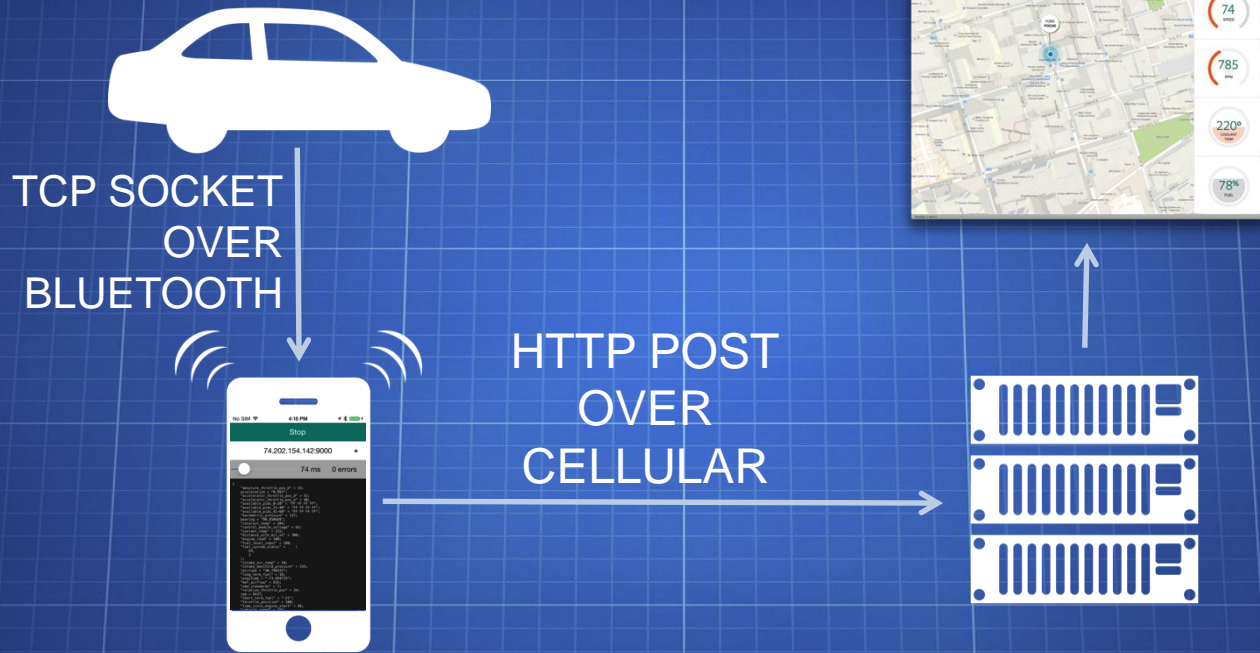
Welcome to the Spring XD shell. For assistance type 'help'

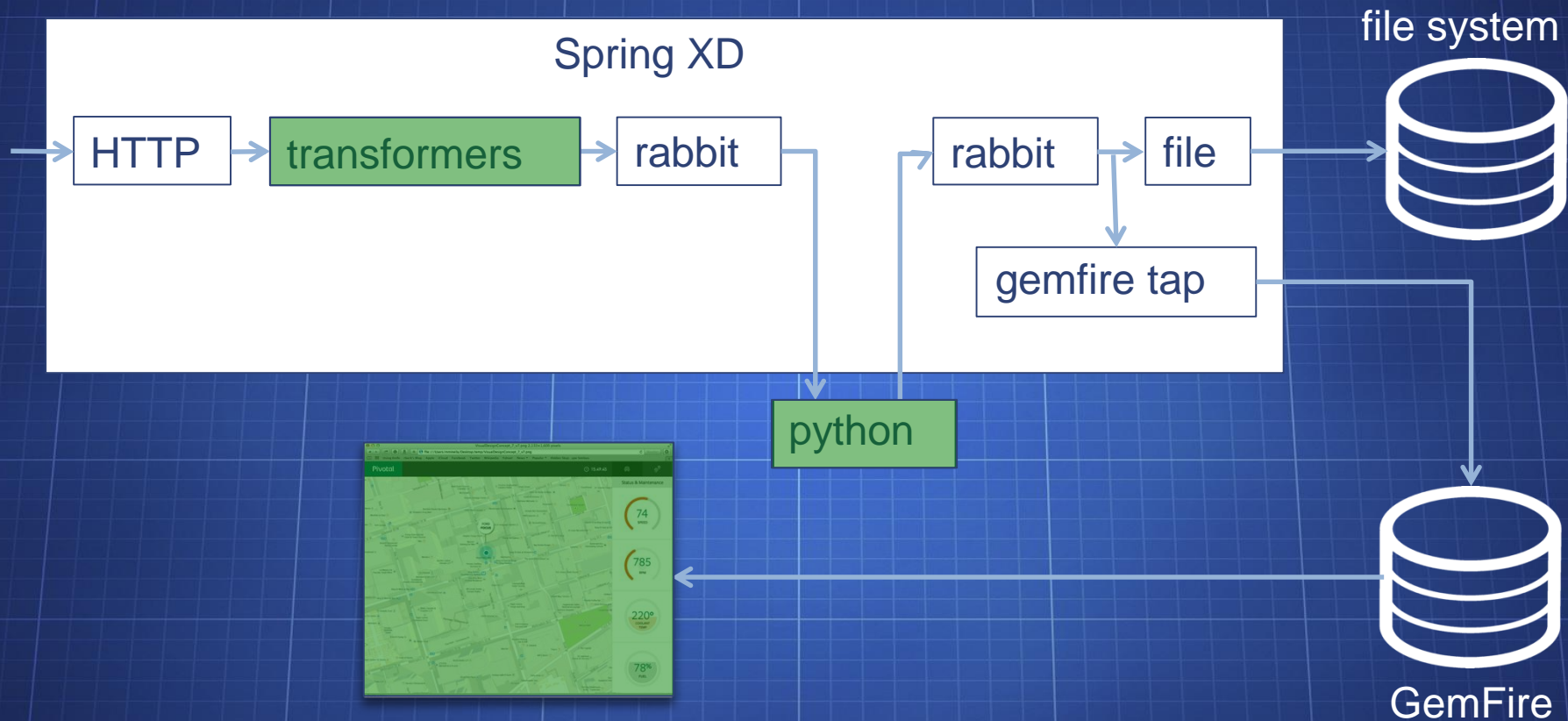
xd:>

http | acmeenrich | object-to-json | rabbit

rabbit | file


```
tap:stream:IoT-HDFS > gemfire-json-server
```





```
/**  
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 * @author gfoster  
 */  
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```

```
    @Bean
```

```
    public Message<?> transform(final Message<?> message) {  
        final Object payload = message.getPayload();  
        Map<String, Object> = new HashMap<>();
```

```
        try {
```

```
        if (payload != null) {
```

```
            map = mapper.readValue(payload.toString(), Map.class);  
            map.put("timestamp", System.currentTimeMillis());  
            map.put("guid", UUID.randomUUID());
```

```
        }  
    }  
}
```



REALTIME DATA SCIENCE

1 PREDICT JOURNEY

2 PREDICT RANGE

HOW DOES IT WORK?



STORE SENSOR

DATA



OFFLINE BATCH TRAINING



INITIAL

PREDICTION





REALTIME EVALUATION

```
...
"Predictions": {
  "ClusterPredictions": {
    "0": {
      "EndLocation": [
        32.98525175453122,
        -96.70940837440399
      ],
      "MPG_Journey": 25.60900810315203,
      "Probability": 0.63736
    },
    ...
  }
}
```



REALTIME DASHBOARD

1 GEMFIRE

2REST

3YOEMAN

4 ANGULARJS

```
/**  
 * Performs the domain transformation into an acme motors specific domain  
 *  
 * @author gfoster  
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            }  
        }  
    }  
}
```



SOLUTION AT **SCALE**



100,000's OF
CLIENTS

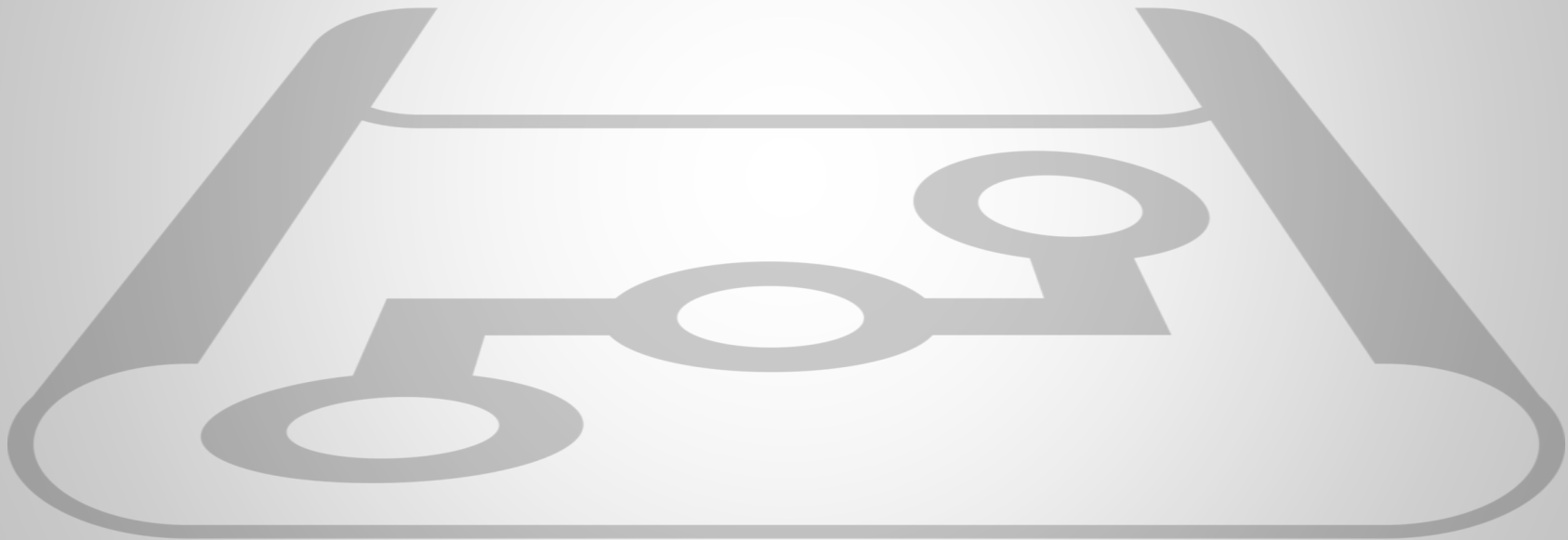


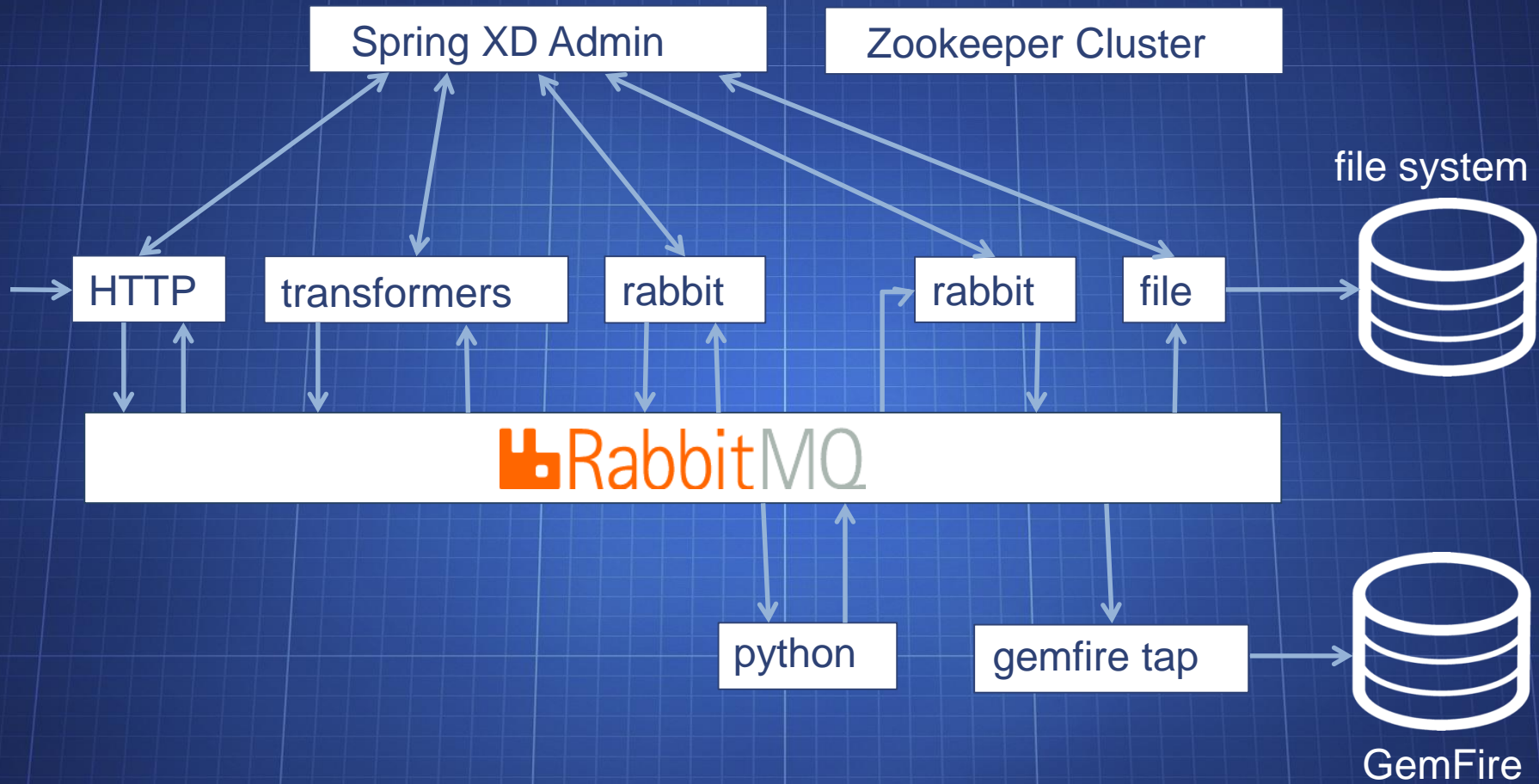
MILLIONS OF
MESSAGE



PER MINUTE OVER
100 GB

WHAT DOES THIS
LOOK LIKE?







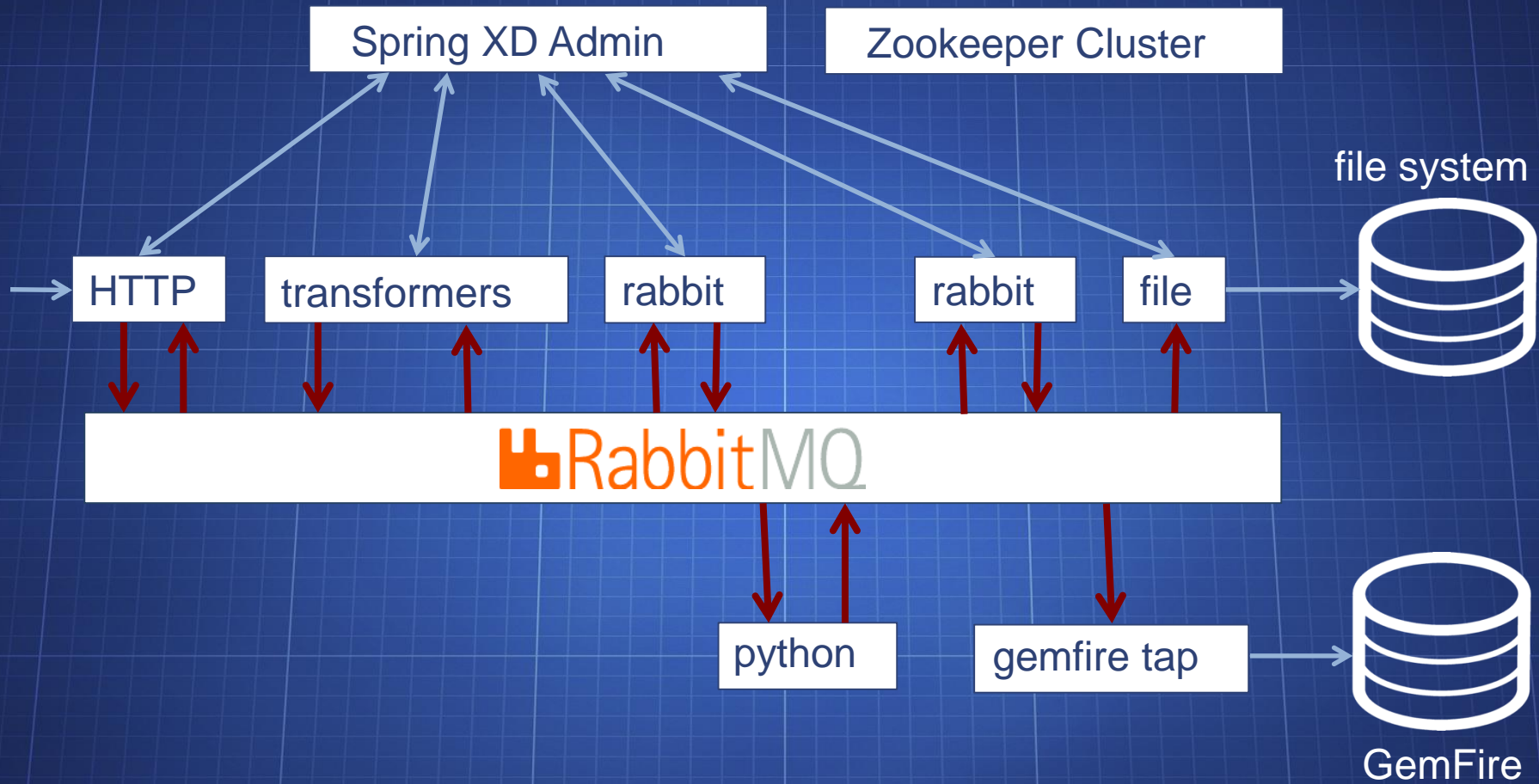
HOW DO WE MAKE IT
FASTER?

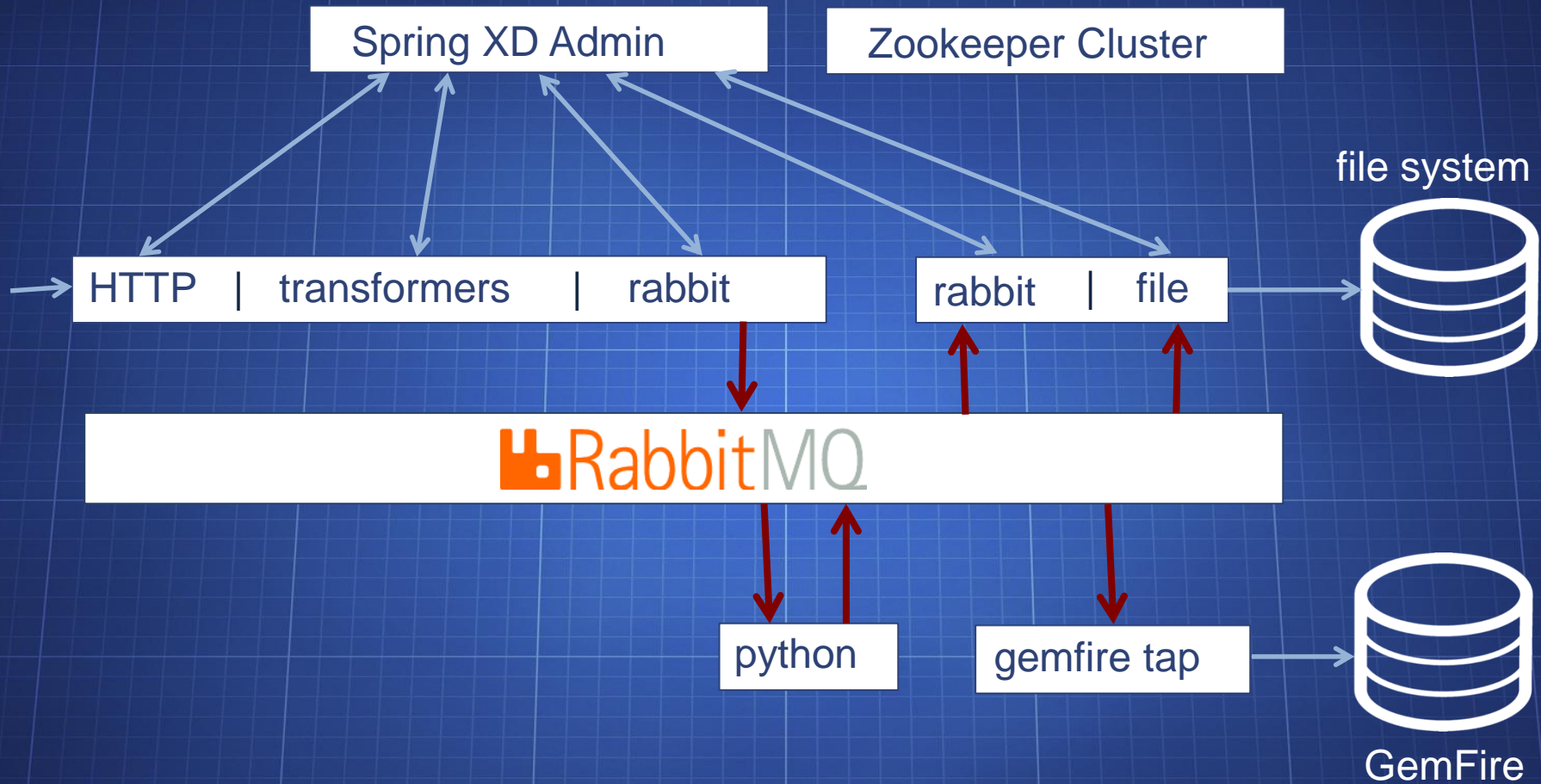


MAKE THE PAYLOAD
SMALLER



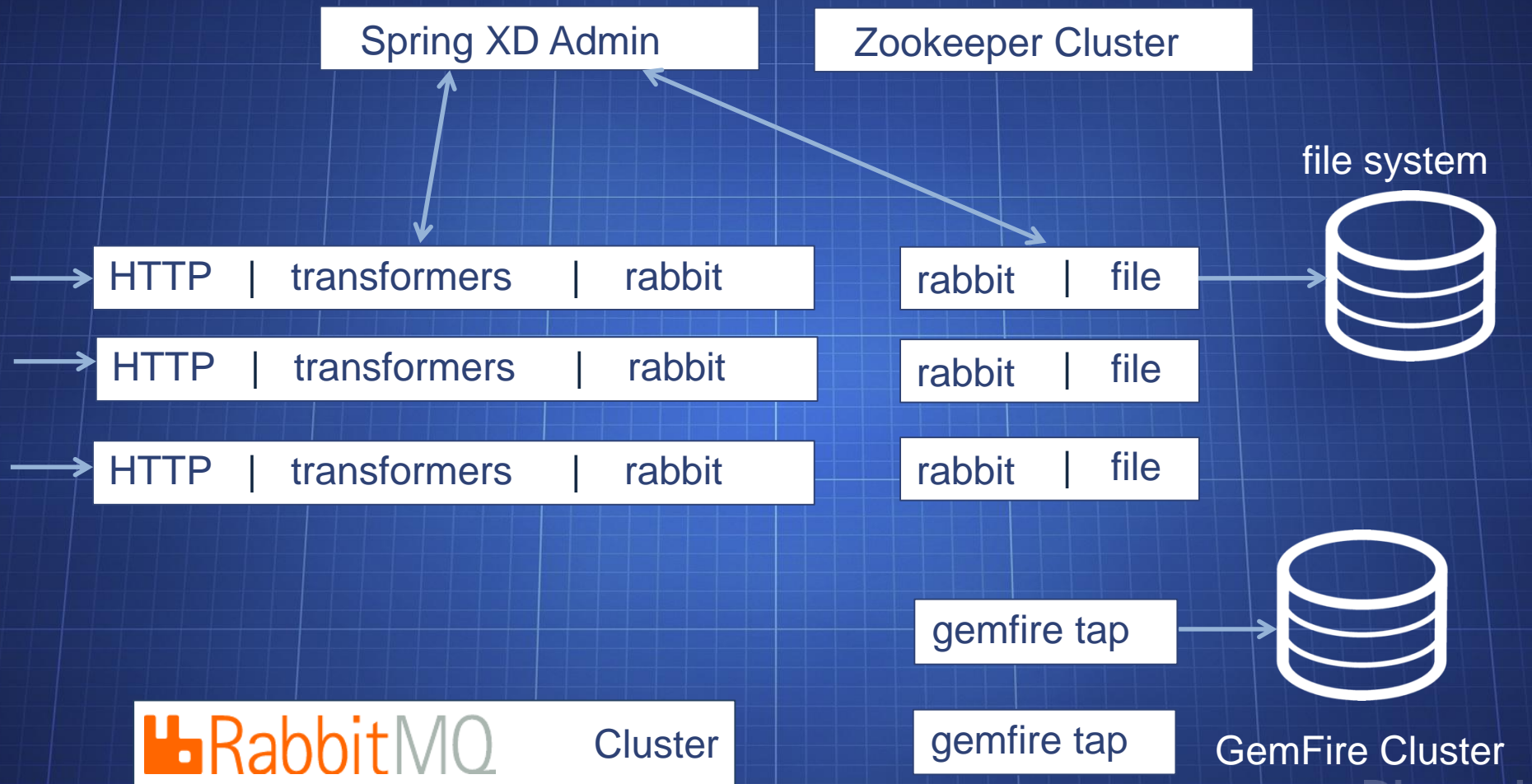
PROCESS IS
I/O BOUND







HIGH AVAILABILITY





IoT ISSUES

CONNECTIVITY



COMPATABILITY





LOOKING INTO THE FUTURE



BATCH TRAINING IN SPRING BATCH

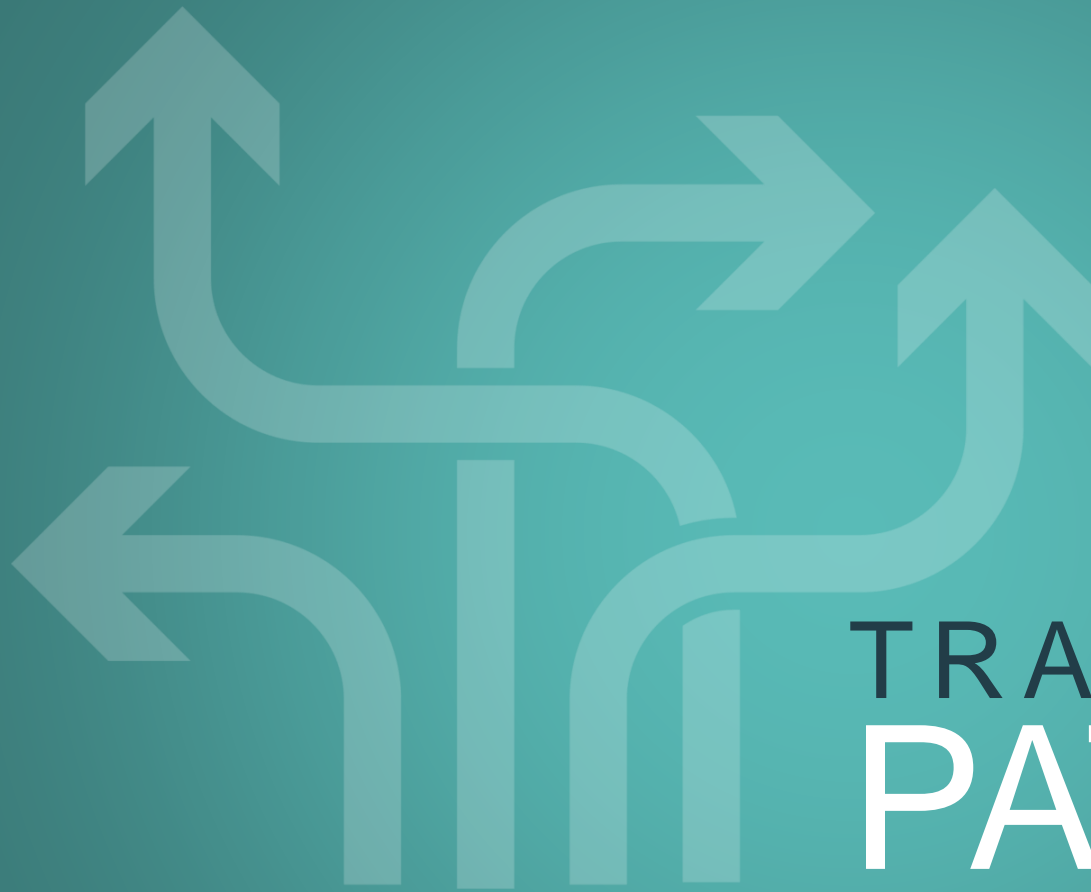




ADDITIONAL USE CASES

DRIVING EFFICIENCY





TRAFFIC PATTERNS



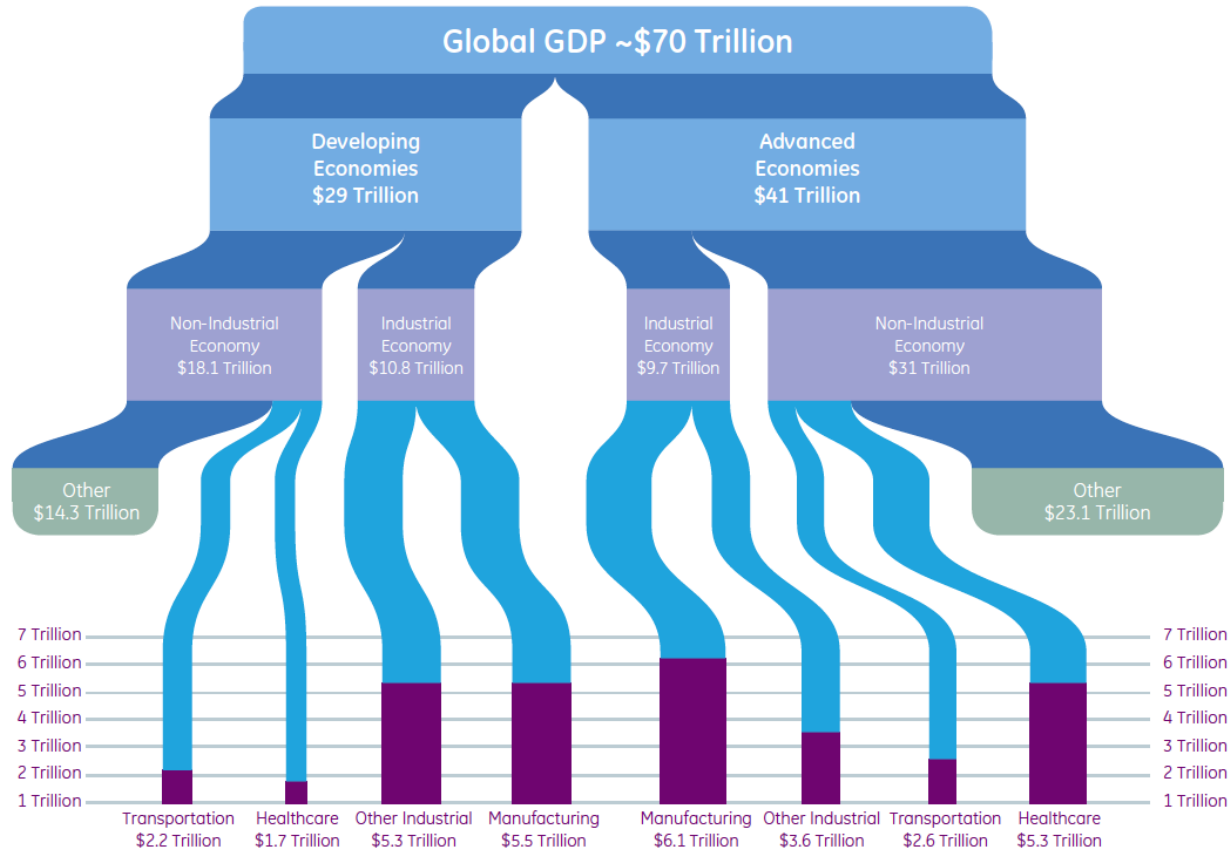
GAS PRICING

ACCIDENT ASSISTANCE



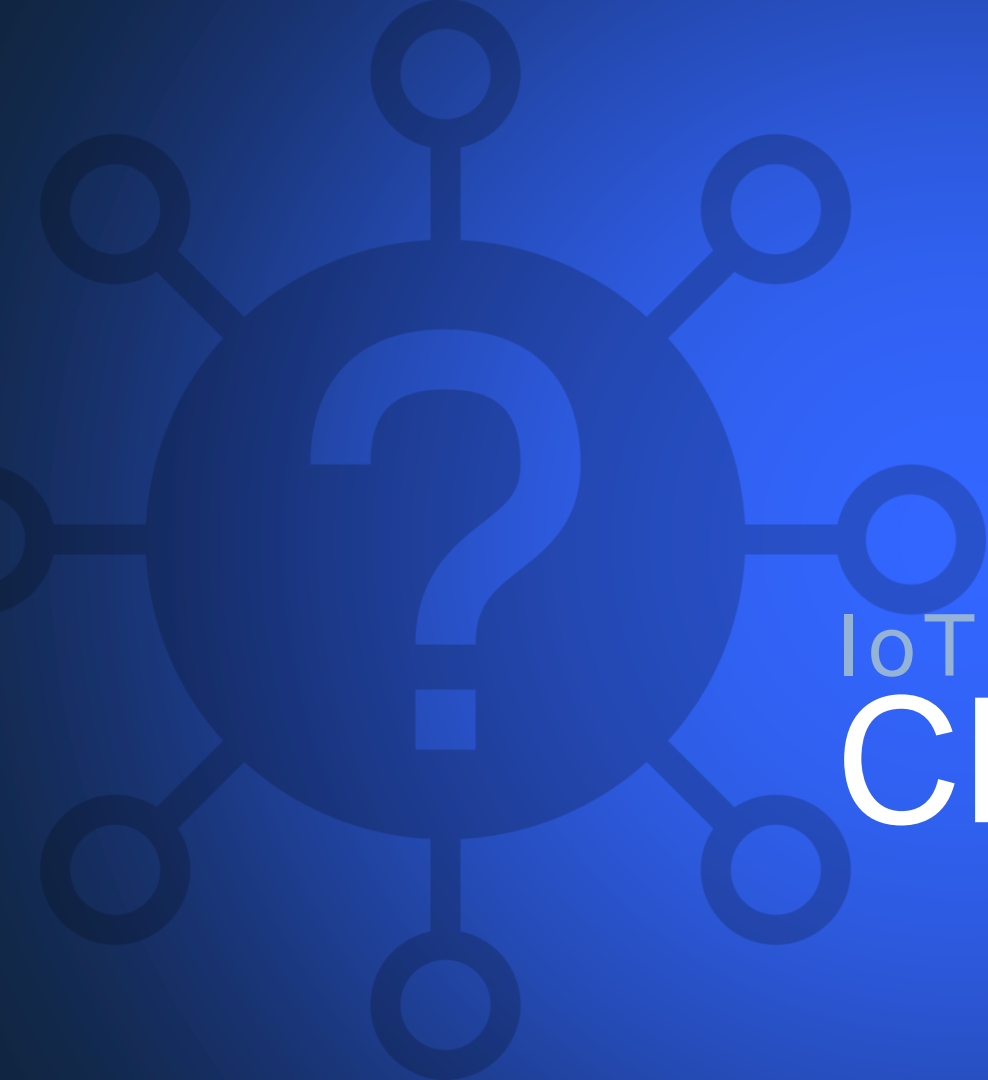


IoT IS
EVERYWHERE



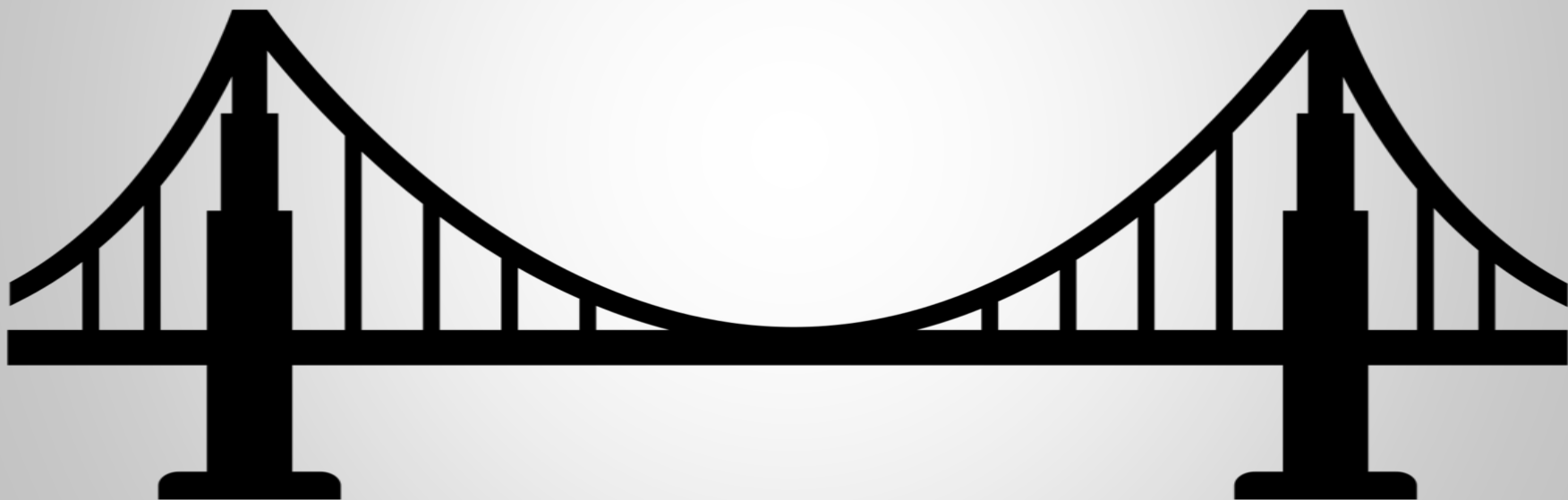
Industrial Internet opportunity (\$32.3 Trillion) 46% share of global economy today

Source: World Bank, 2011 and General Electric



IoT PRESENTS UNIQUE CHALLENGES

IF YOU CAN BRIDGE THE GAPS





SPRING XD

MAKES THE REST EASY



Learn More. Stay Connected.



Spring Framework

Project: spring.io/spring-framework

Github: github.com/spring-projects/spring-framework

Jira: jira.spring.io/browse/SPR

Spring Boot

Project: spring.io/spring-boot

Github: github.com/spring-projects/spring-boot

Spring XD

Project: spring.io/spring-xd

Github: github.com/spring-projects/spring-xd

Jira: jira.spring.io/browse/XD

Twitter: twitter.com/springcentral

YouTube: spring.io/video

LinkedIn: spring.io/linkedin

Google Plus: spring.io/gplus



Connected Car by OliM
from The Noun Project



Scale by Edward Boatman
from The Noun Project



Question by Jessica Lock
from The Noun Project



Servers by Jaime Carrion
from The Noun Project



Running by Dillon Arloff
from The Noun Project



Puzzle by Matthew Hall
from The Noun Project



Sad by Austin Condifff
from The Noun Project



Happy by Austin Condifff
from The Noun Project



Nut by Naomi Atkinson
from The Noun Project



iPhone by Oleg Frolov
from The Noun Project



Plus by P.J. Onori
from The Noun Project



Erlenmeyer Flask by Emily van den Heeve
from The Noun Project



Loop by useiconic.com
from The Noun Project



Square Peg Round Hole by Brady Clark
from The Noun Project



Arrows by Juan Pablo Bravo
from The Noun Project



Flow Chart by Michael Wohlwend
from The Noun Project



Network by Mister Pixel
from The Noun Project



Car Accident by Stephanie Wauters
from The Noun Project



Contract by Dmitry Baranovskiy
from The Noun Project



Thumbs Up by Alv Jørgen Bovolden
from The Noun Project



World by Janique Le Bail
from The Noun Project



Stopwatch by Scott Lewis
from The Noun Project



Puzzle by Eric M. Ellis
from The Noun Project



Thinking by Jens Tärning
from The Noun Project



Clock by Nick Green
from The Noun Project



Database by Anton Outkine
from The Noun Project



Refridgerator by Rohan Gupta
from The Noun Project



Car by Laura Beggs
from The Noun Project



Car Accident by Stephanie Wauters
from The Noun Project



Error by Dmitry Baranovskiy
from The Noun Project



Blueprint by Dmitry Sokolov
from The Noun Project



Hard Drive by Mike Wirth
from The Noun Project



Fuel by Yair Cohen
from The Noun Project

The End