Sparkling Water 2.0

Michal Malohlava

michal@h2o.ai

H2O Open Tour 2016,
Dallas, TX
October 26, 2016

SPARKLING
WATER

H2O + Spark

=

Sparkling Water

Sparkling Water provides

Transparent integration of H2O machine learning platform with Spark ecosystem

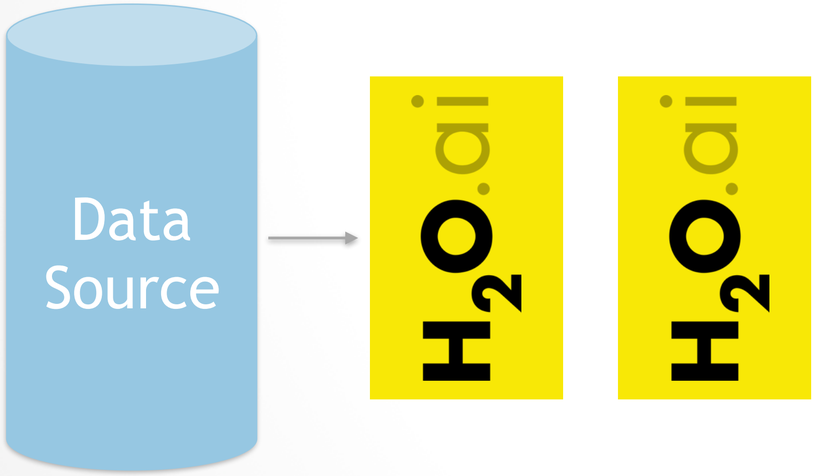
Transparent use of **H2O data structures** (H2OFrame) and **algorithms** with **Spark API**

Excels in existing Spark workflows requiring advanced Machine Learning algorithms

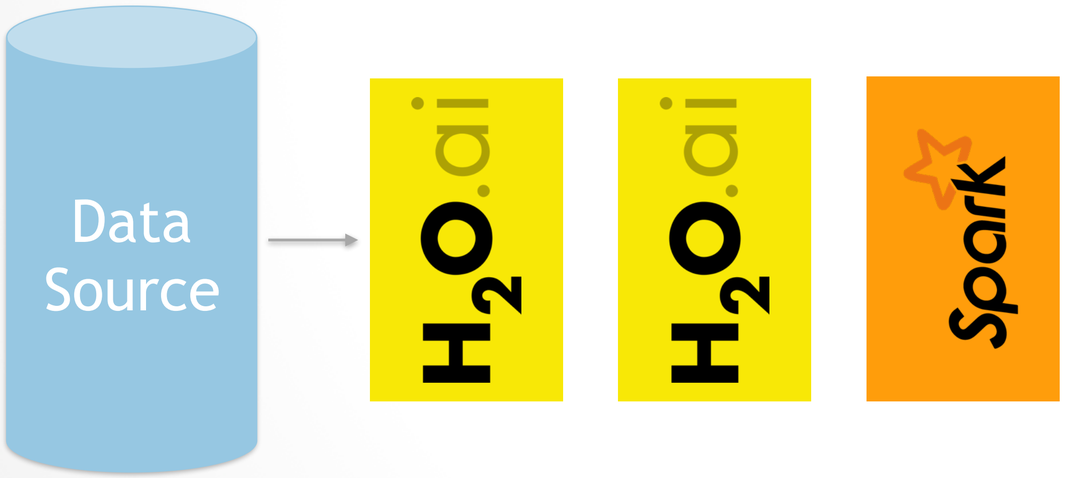
Functionality missing in H2O can be replaced by Spark and vice versa

Data Munging & Modeling

Data Munging & Modeling



Data Munging & Modeling



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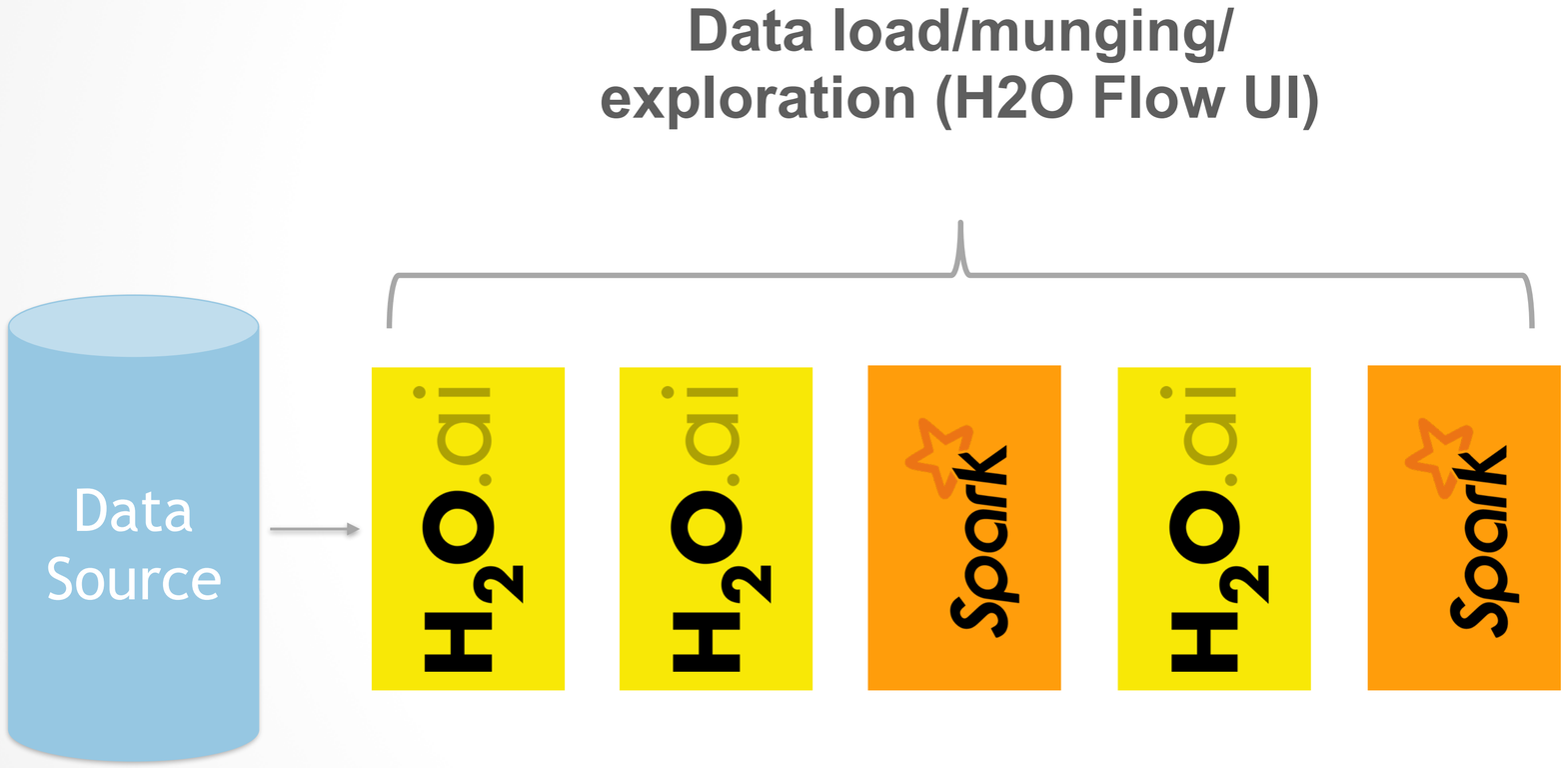

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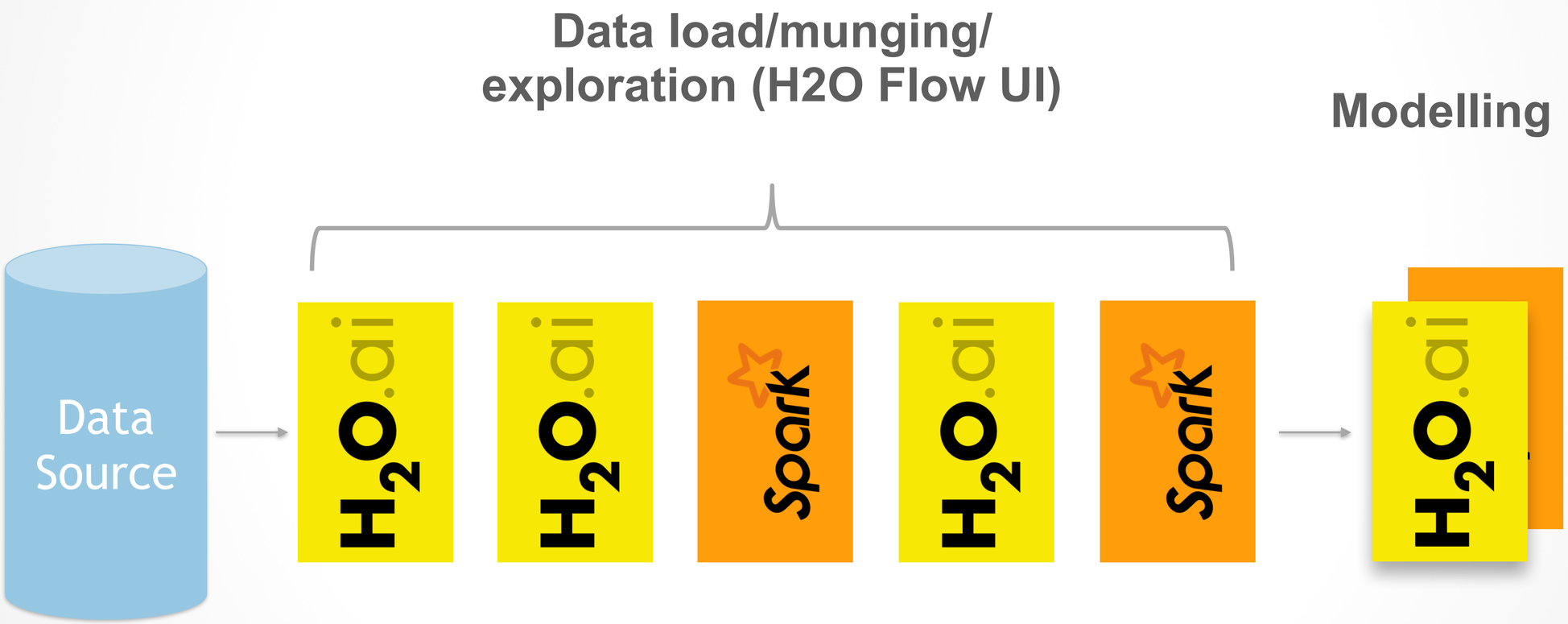
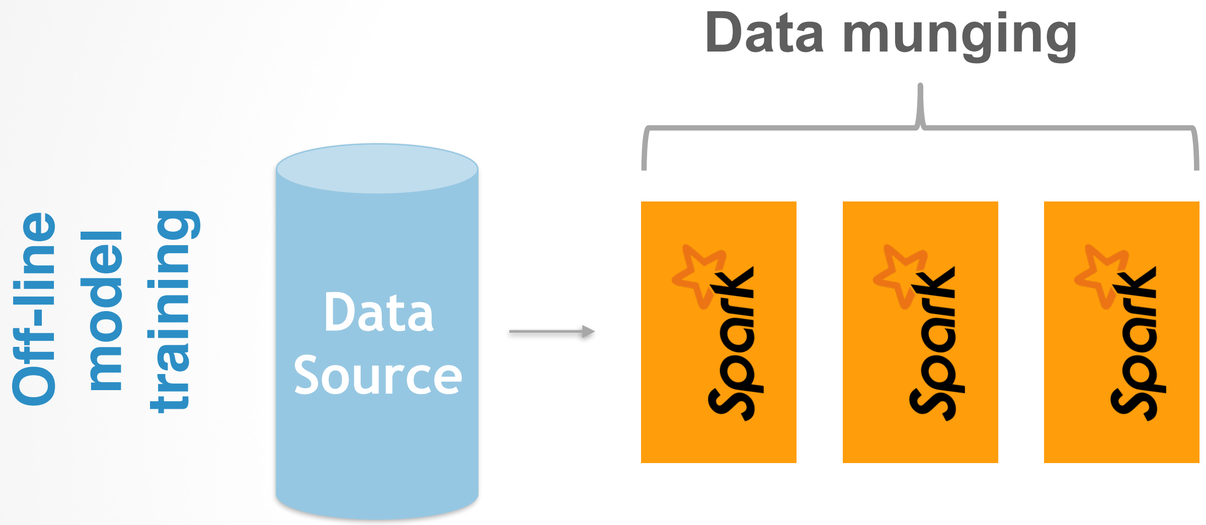


Stream processing

Stream processing

Off-line model training

Stream processing



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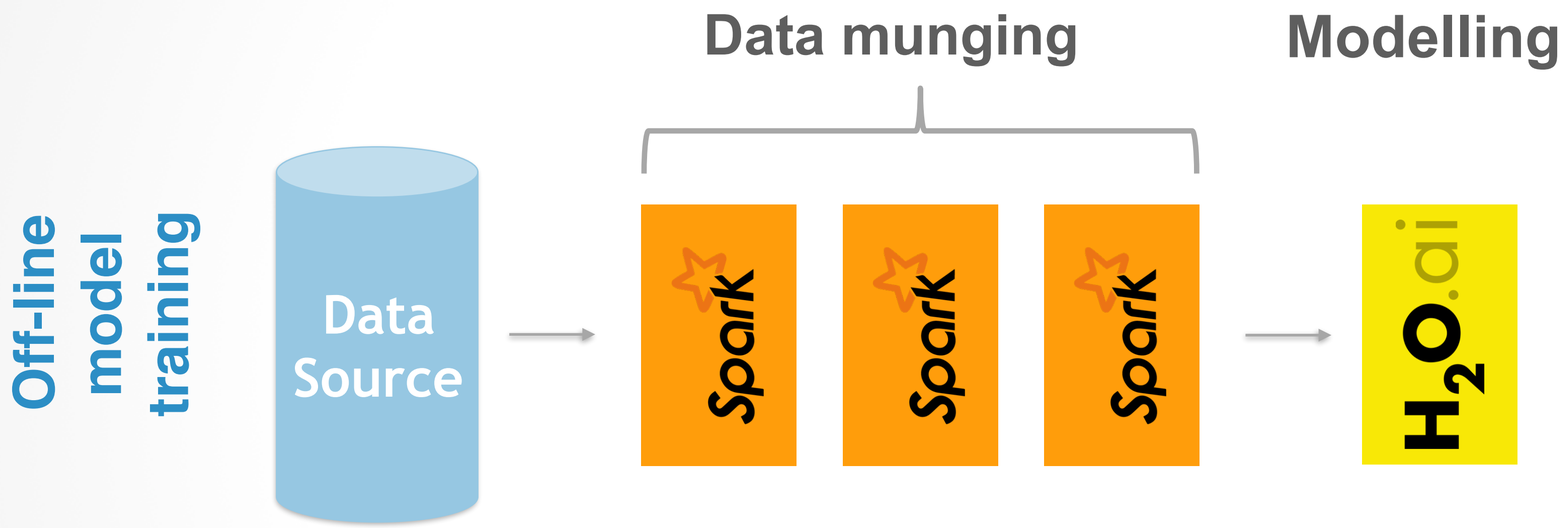

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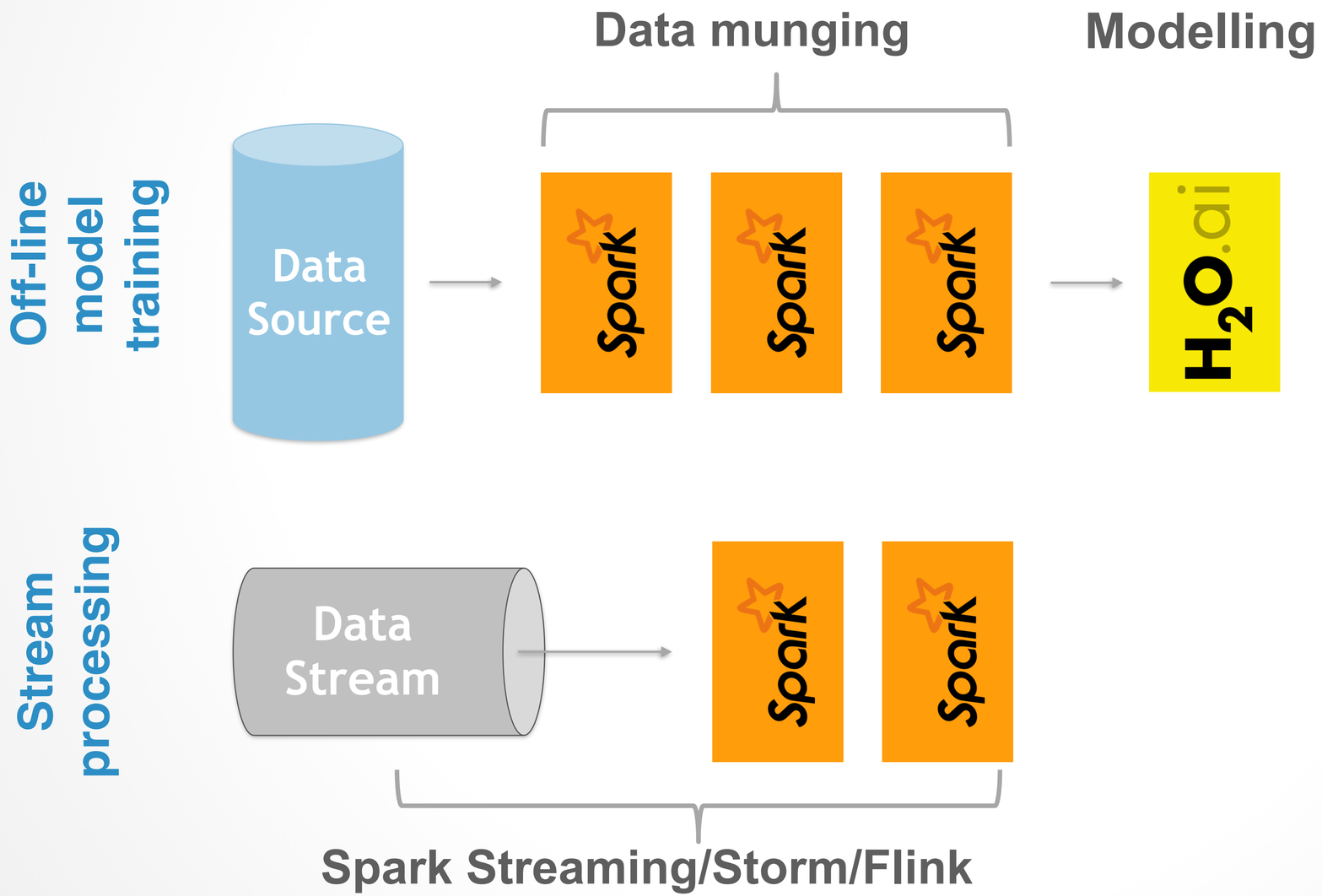

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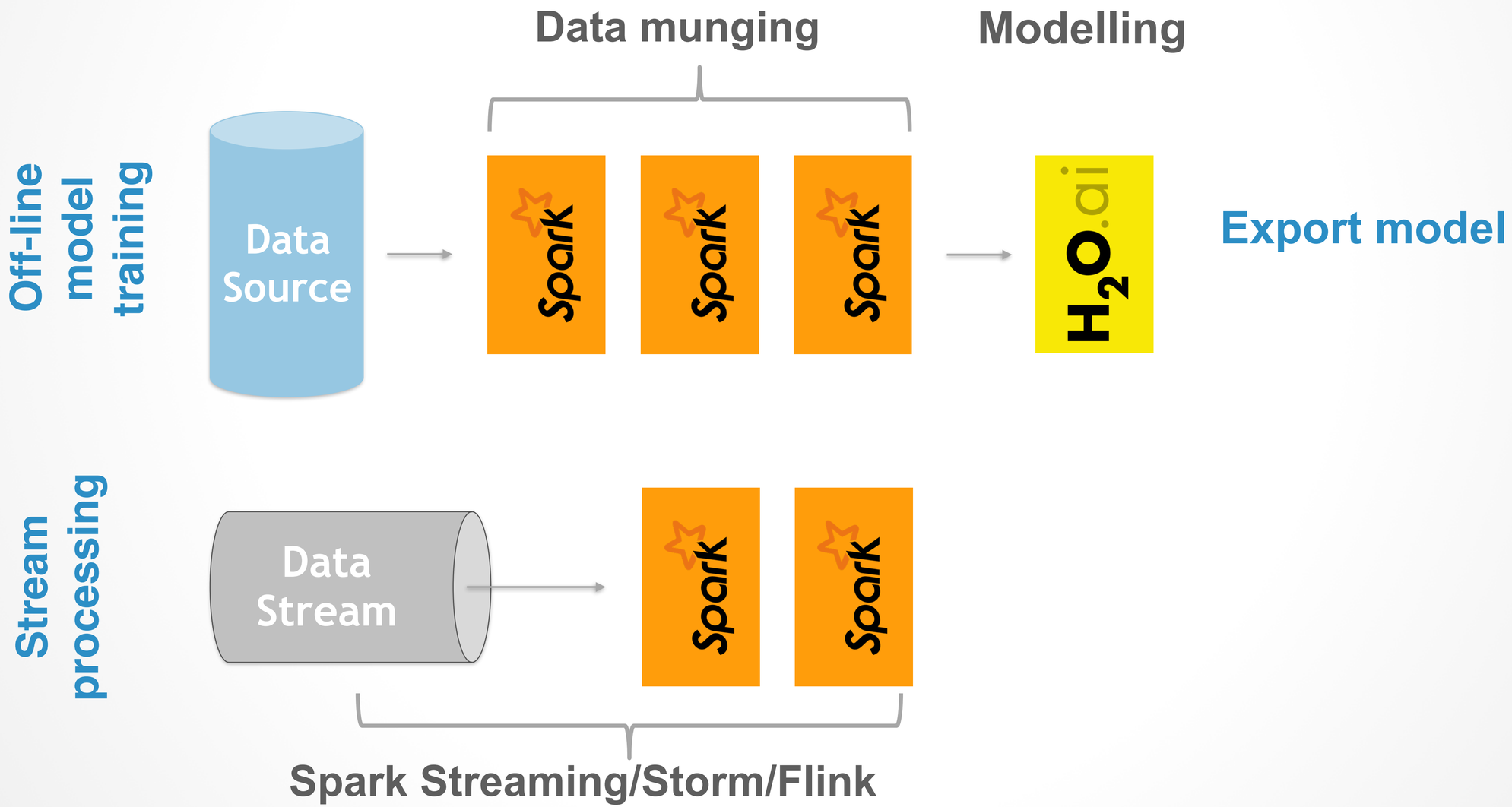
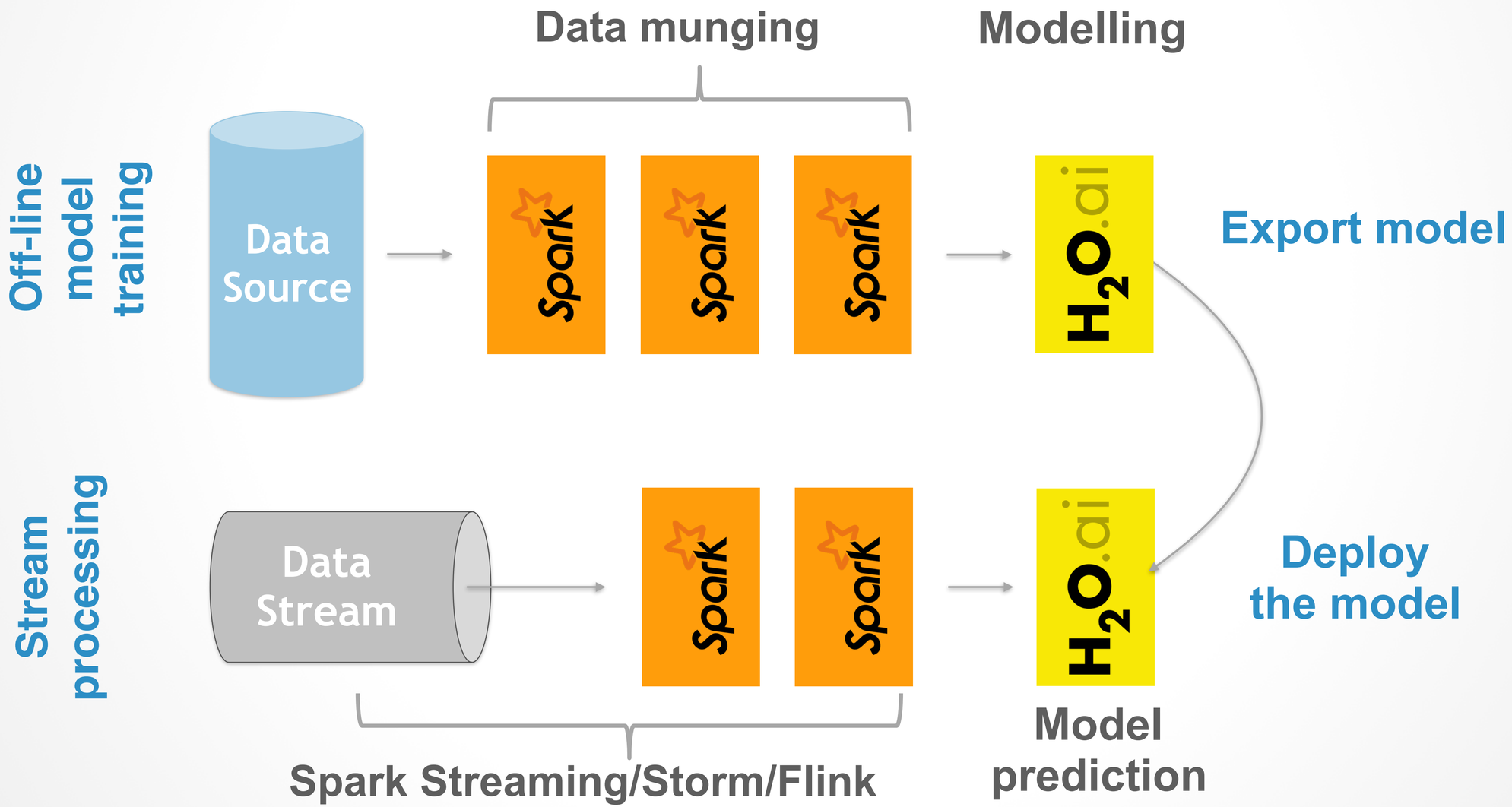
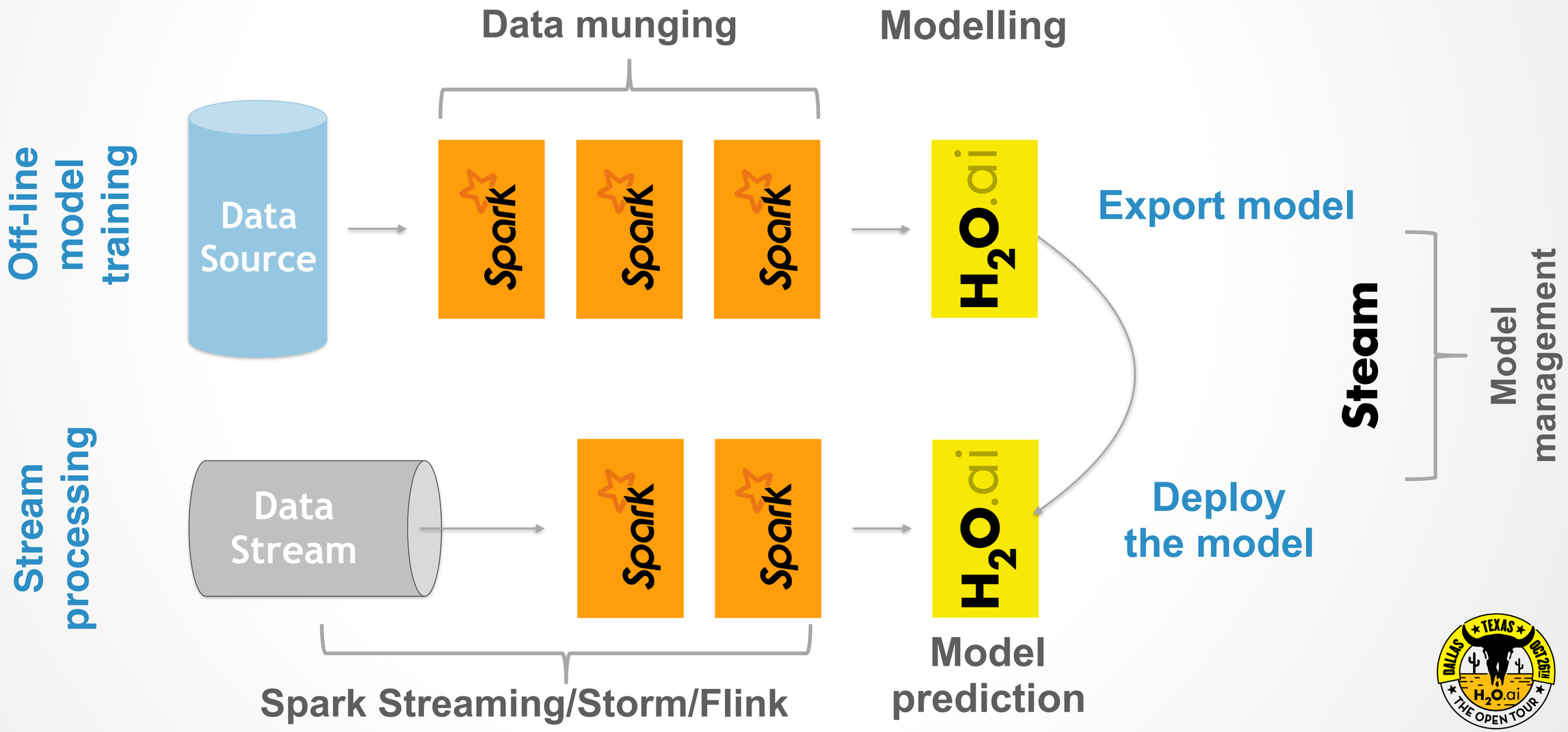


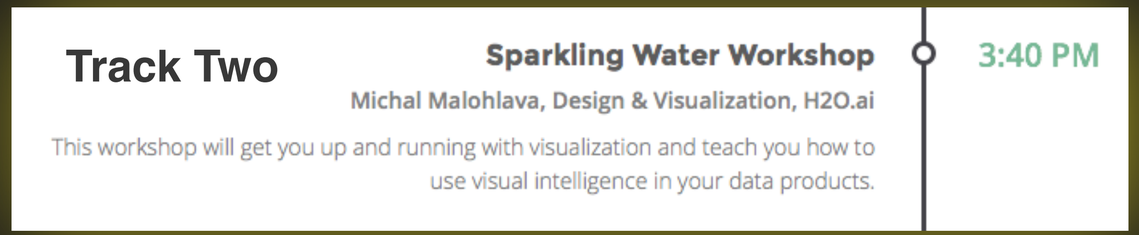
Stream processing



Stream processing



Interested in more details?



What's new in 2.0 ?

Releasing Schema

H2O.ai

Spark 1.5 + Latest ⇒ 1.5.x SPARKLING WATER

Back porting new features

Spark 1.6 + Latest ⇒ 1.6.x SPARKLING WATER

Back porting new features

Spark 2.0 + Latest ⇒ 2.0.x SPARKLING WATER

Spark 2.0 API Support

✓ Support of Spark **Session** based API

✓ More aggressive **optimization** during Spark DataFrame to H2OFrame transformation

✓ **Scala 2.11** support

- useful if you are building Spark based applications

Datasets Support

✓ Support of new Spark data structure **DataSet**

- **DataSet: fusion of strongly typed RDD[X] and DataFrame query API**

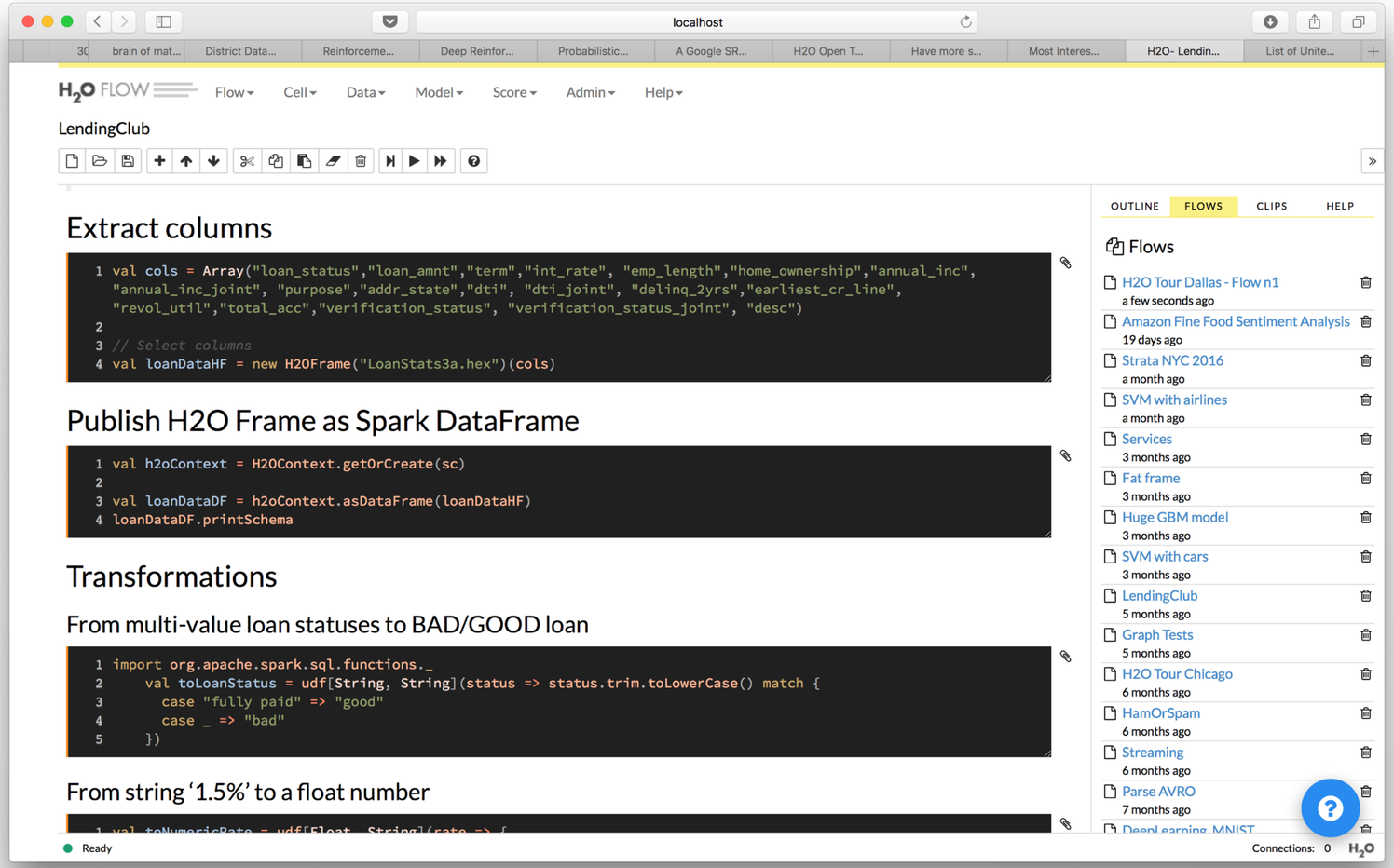
```
case class SamplePerson(name: String, age: Int, email: String)

val dataSource = ...

val samplePeople: List[SamplePerson] = dataSource map SamplePerson.tupled
// Create Dataset
val df: Dataset[SamplePerson] = sqlContext.createDataset(samplePeople)

// Publish Dataset as H2OFrame
val hf: H2OFrame = h2oContext.asH2OFrame(df)
```

Available in Sparkling Water 1.6!

Scala Code from Browser

✓We can now execute Scala code directly from H2O Flow UI!

Available in Sparkling Water 1.6!



H2O.ai

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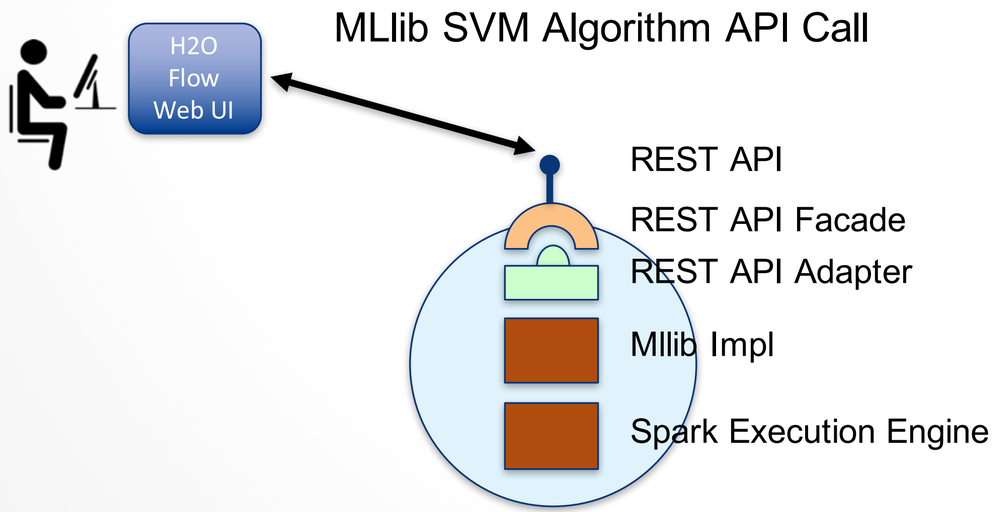
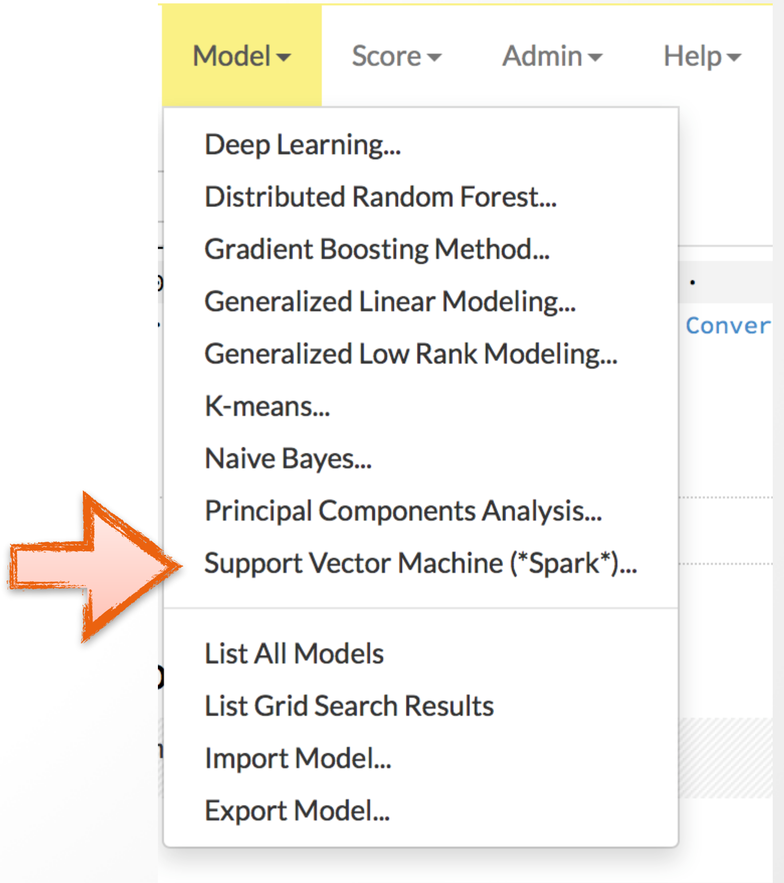
Spark Models in Flow UI

Spark algorithms can be called from H2O Flow UI

- ✓ Quick visual feedback
- ✓ Model performance reports
- ✓ Model export (as code)





H2O.ai

RSparkling

- ✓ A New Member of Sparkling Water Ecosystem

sparklyr

RSparkling

✓ A New Member of Sparkling Water Ecosystem

Scala: Sparkling Water

Spark

```
val sc =
SparkContext.getOrCreate(...)

val df = sc.parallelize(1 to 10).toDF
```

sparklyr

```
val h2oContext =
H2OContext.getOrCreate(sc)

val hf = h2oContext.asH2OFrame(df)
```

H2O.ai

RSparkling

✓ A New Member of Sparkling Water Ecosystem

Scala: Sparkling Water	Python: PySparkling Water
Spark	PySpark
val **sc** = **SparkContext**.getOrCreate(…)	**sc** = **SparkContext**(…)
val df = sc.parallelize(1 to 10).toDF	df = sc.parallelize(range(1,11)) .toDF(“int”)
val h2oContext = **H2OContext**.getOrCreate(**sc**)	h2o_context = **H2OContext**.getOrCreate(**sc**)
val hf = h2oContext.**asH2OFrame**(df)	hf = h2o_context.**as_h2o_frame**(df)

sparklyr

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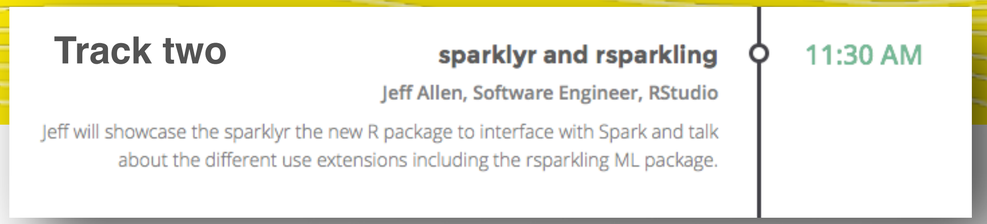
RSparkling

✓ A New Member of Sparkling Water Ecosystem

Scala: Sparkling Water	Python: PySparkling Water	R: RSparkling Water
Spark val **sc** = **SparkContext**.getOrCreate(…) val df = sc.parallelize(1 to 10).toDF	PySpark **sc** = **SparkContext**(…) df = sc.parallelize(range(1,11)) .toDF(“int”)	sparklyr **sc** <- **spark_connect**(…) tbl <- data_frame(c(1:10)) df <- copy_to(**sc**, tbl)
val h2oContext = **H2OContext**.getOrCreate(**sc**) val hf = h2oContext.**asH2OFrame**(df)	h2o_context = **H2OContext**.getOrCreate(**sc**) hf = h2o_context.**as_h2o_frame**(df)	hc <- **h2o_context**(**sc**) hf <- **as_h2o_frame**(**sc**, df)

RSparkling



✓ A New Member of Sparkling Water Ecosystem

Scala: Sparkling Water

Spark

```
val sc =
SparkContext.getOrCreate(...)

val df = sc.parallelize(1 to 10).toDF
```

```
val h2oContext =
H2OContext.getOrCreate(sc)

val hf = h2oContext.asH2OFrame(df)
```

Python: PySparkling Water

PySpark

```
sc = SparkContext(...)

df = sc.parallelize(range(1,11))
       .toDF("int")
```

```
h2o_context =
H2OContext.getOrCreate(sc)

hf = h2o_context.as_h2o_frame(df)
```

R: RSparkling Water

sparklyr

```
sc <- spark_connect(...)

tbl <- data_frame(c(1:10))
df <- copy_to(sc, tbl)
```

```
hc <- h2o_context(sc)

hf <- as_h2o_frame(sc, df)
```

Available in Sparkling Water 1.6!

H2O.ai

Coming soon...

Bringing both platforms together

API Convergence

- H2O model builders compatibility with Spark pipelines
  - Scala/Python level
- Reuse existing Spark functionality
  - e.g., applying Spark UDFs directly on H2OFrame
- Heterogenous (Spark/H2O) model ensembles/pipelines
- More Spark Algorithms in UI
  - e.g. ALS

Coming soon!

More Tooling From H2O Ecosystem

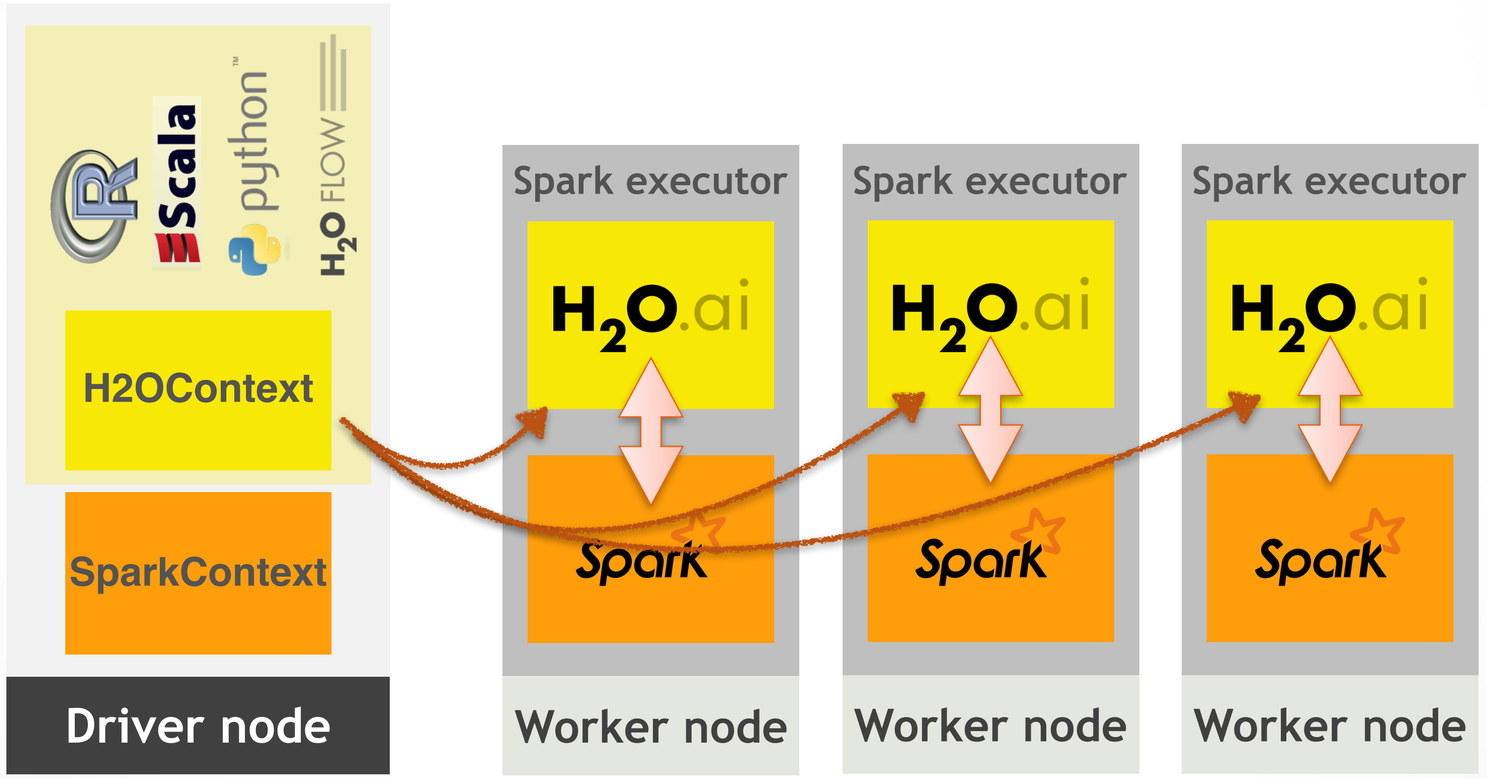
- Exposing **DeepWater** Algorithms

- Integration with **Steam**
  - Steam as Sparkling Water **launcher**
  - Steam as **model manager**

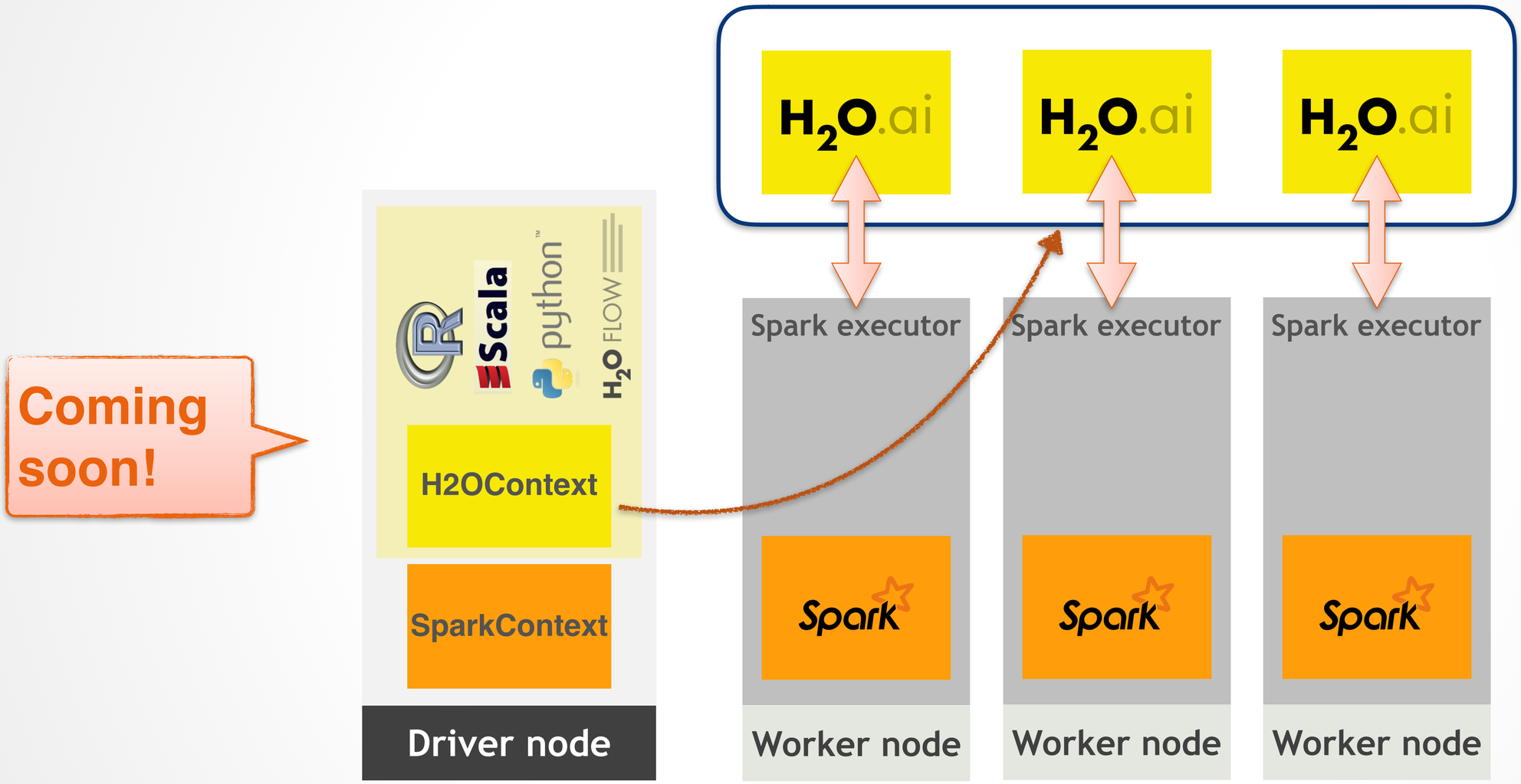
Coming soon!

High Availability

NOW



High Availability



Thank you!

Sparkling Water is
open-source
ML application platform
combining
power of Spark and H2O

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Follow us at @h2oai