Spark et le streaming

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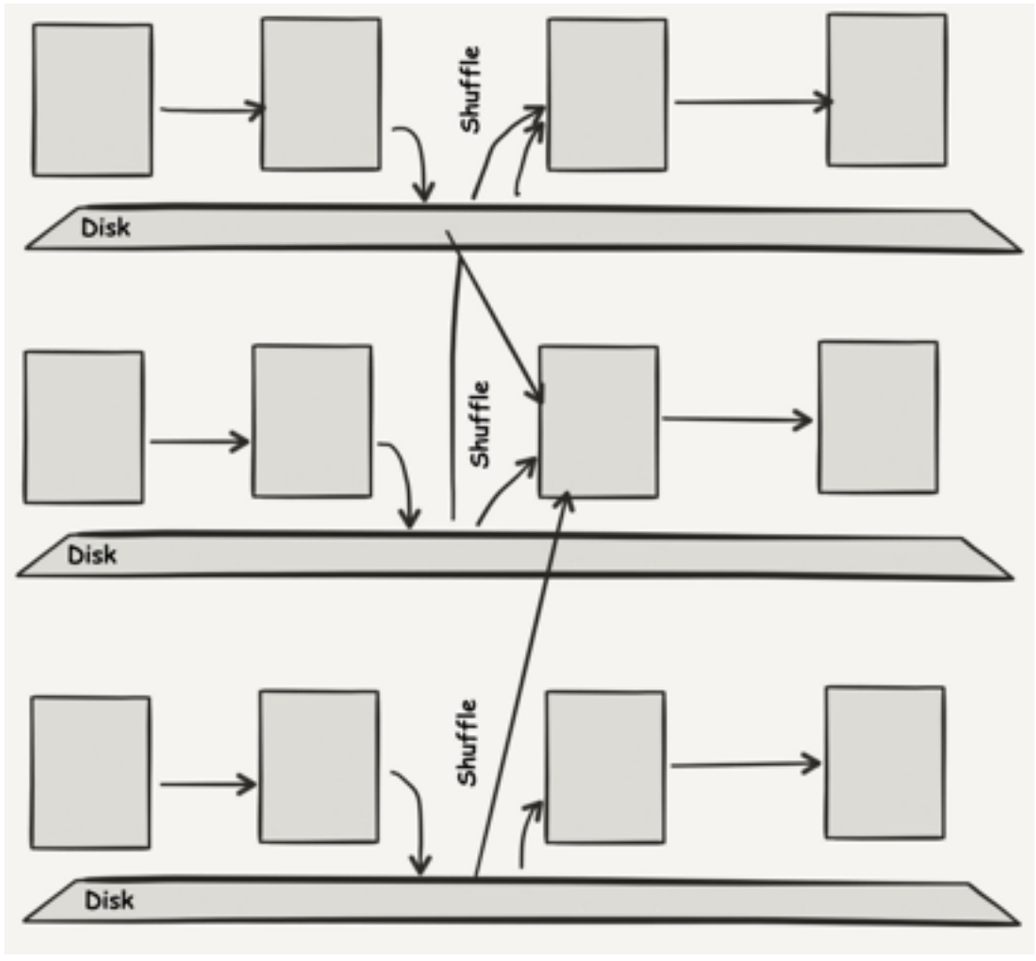
Optimisation

Optimisation

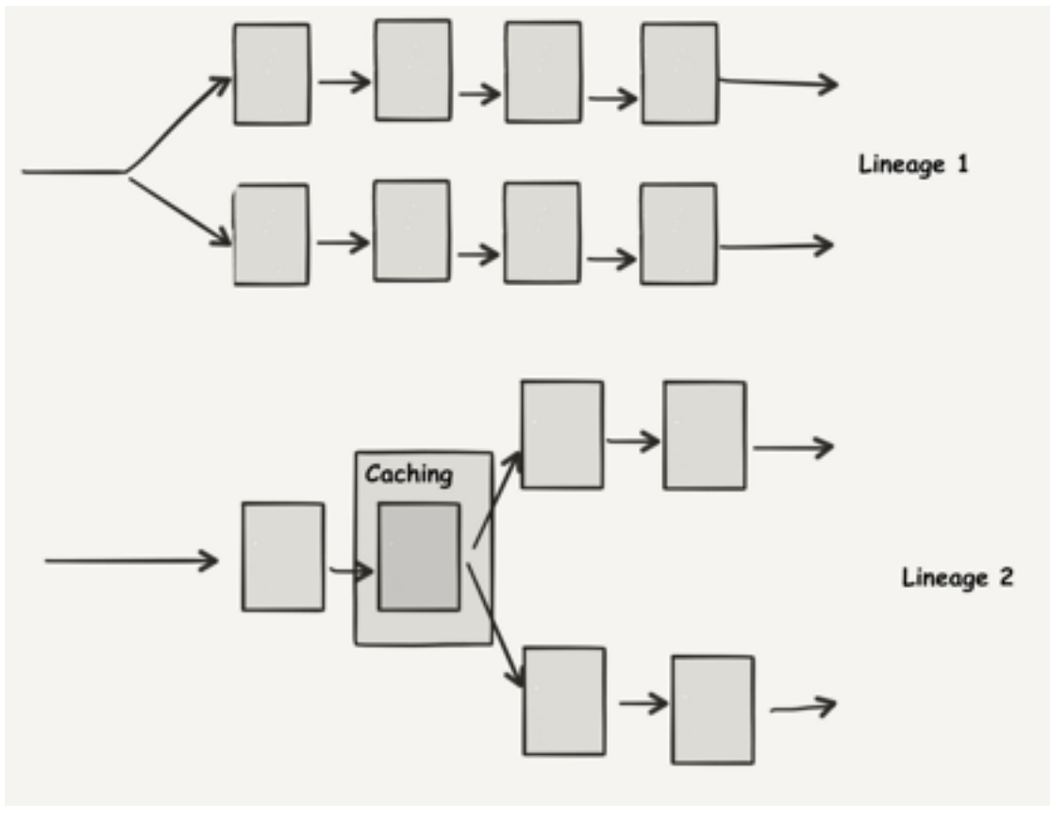
- Plan de calcul & Spark UI
- Partitionnement & Shuffling
- Caching & Checkpointing

Partitionnement & Shuffling



Caching & Checkpointing

- Caching/Persisting



Caching & Checkpointing

- Caching/Persisting
  - Ecrit en mémoire et/ou sur disque
  - Garde le lineage
  - Supprimé à la fermeture de l’application
- Type de sauvegarde
  - Sur disque
  - En mémoire
  - Sérialisé

Caching & Checkpointing

- Checkpointing
  - Ecrit sur disque
  - Supprime le lineage
    - Sauvegardé même après fermeture (utilisable par d’autre jobs)
    - Lent : mise en cache puis écriture sur disque recommandé

Caching & Checkpointing

- Sauvegarde de résultats intermédiaires pour réutilisation
- Plusieurs sauvegarde possibles :

	Caching	Checkpointing
Sauvegarde	Temporaire	Permanente
Cas d'utilisation	Réutilisation multiple d'un résultat	Sauvegarde d'un résultat après >100 transformations

Caching & Checkpointing

- TP

Spark Streaming

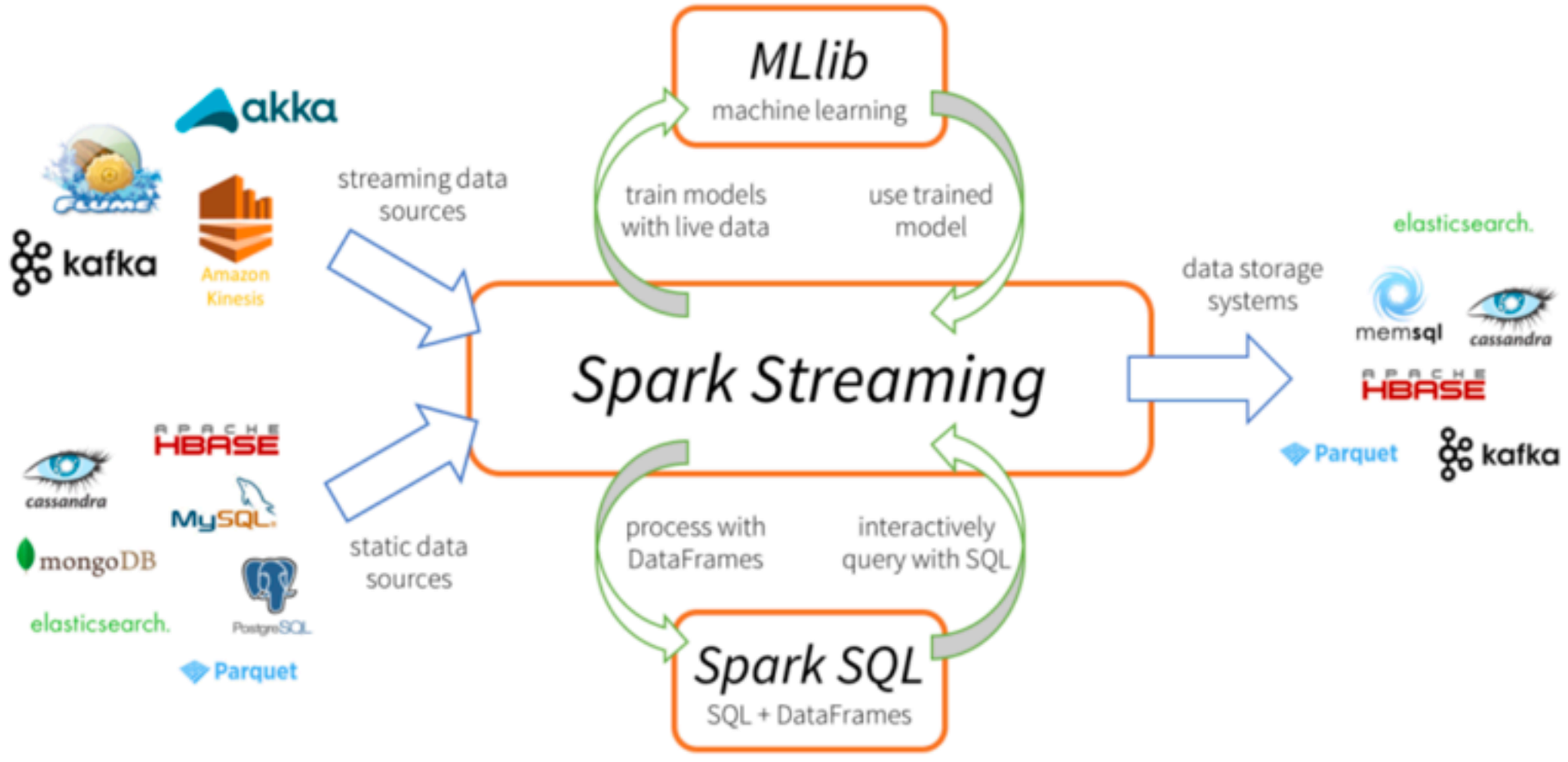
Spark Streaming

- Spark Streaming :
  - Récupère la donnée
  - Renvoie batch de données (DStream)
- Spark Engine
  - Manipulation des Stream

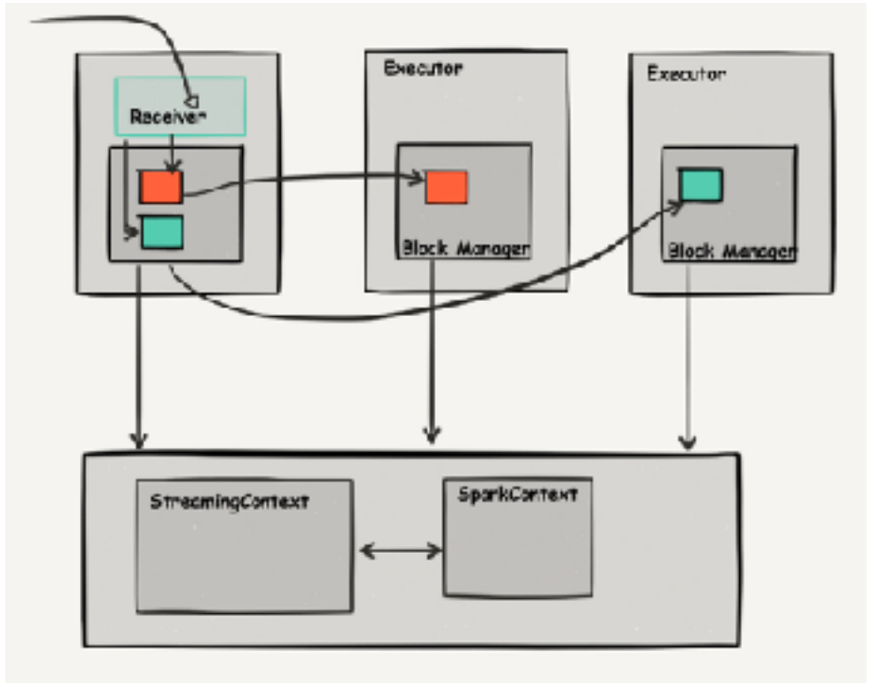
Spark Streaming

- Source de données:
  - Kafka / Flume / Kinesis / …
  - HDFS / S3
  - TCP
  - Twitter

Spark Streaming

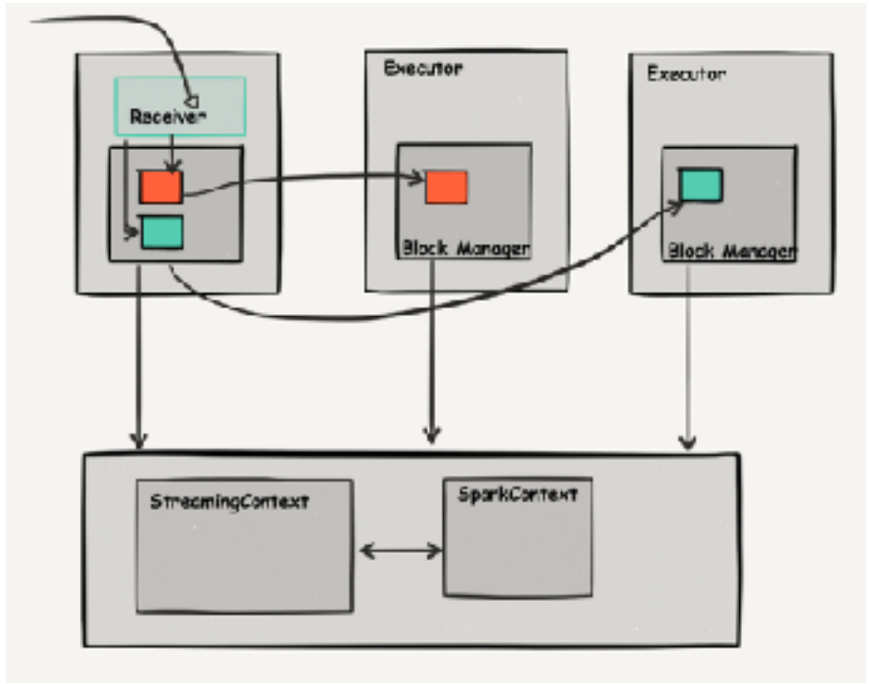


- Receivers

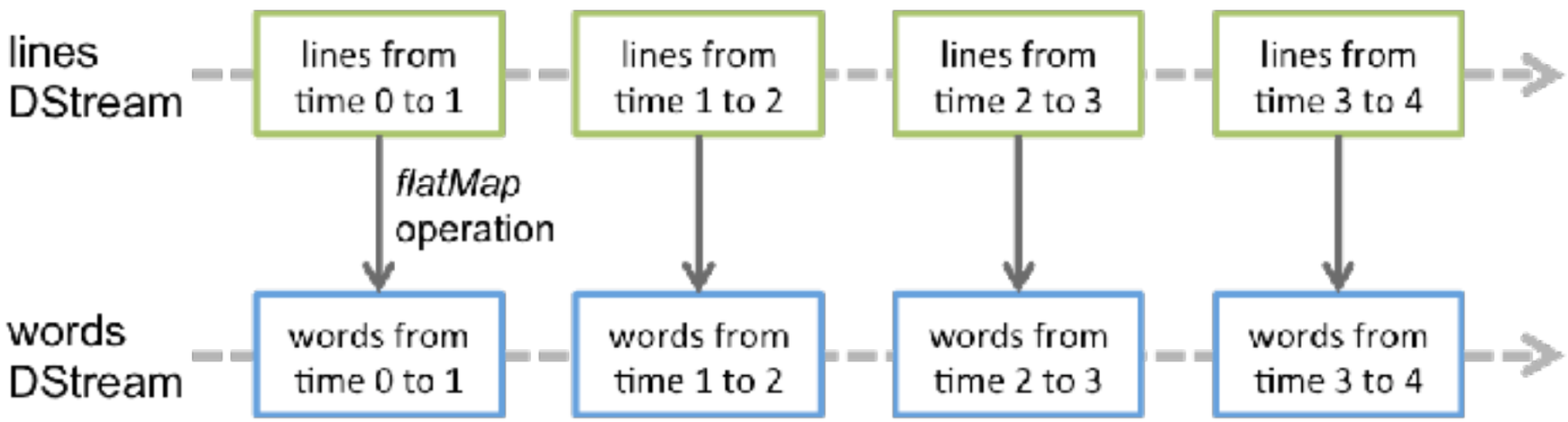


- DStream

- Receivers



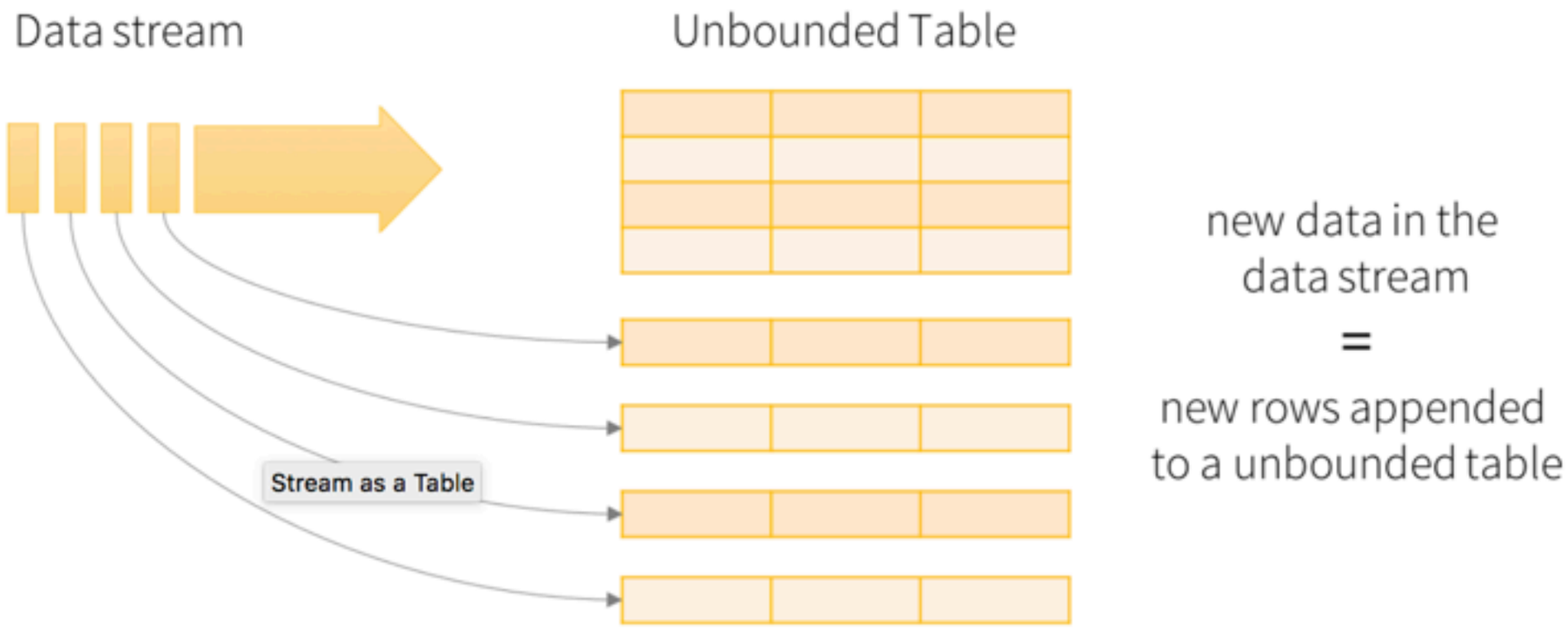
- DStream



Spark Structure Streaming

- RDD > Spark SQL (Dataframe)
- Spark Streaming > Spark Structured Streaming

Spark Structure Streaming



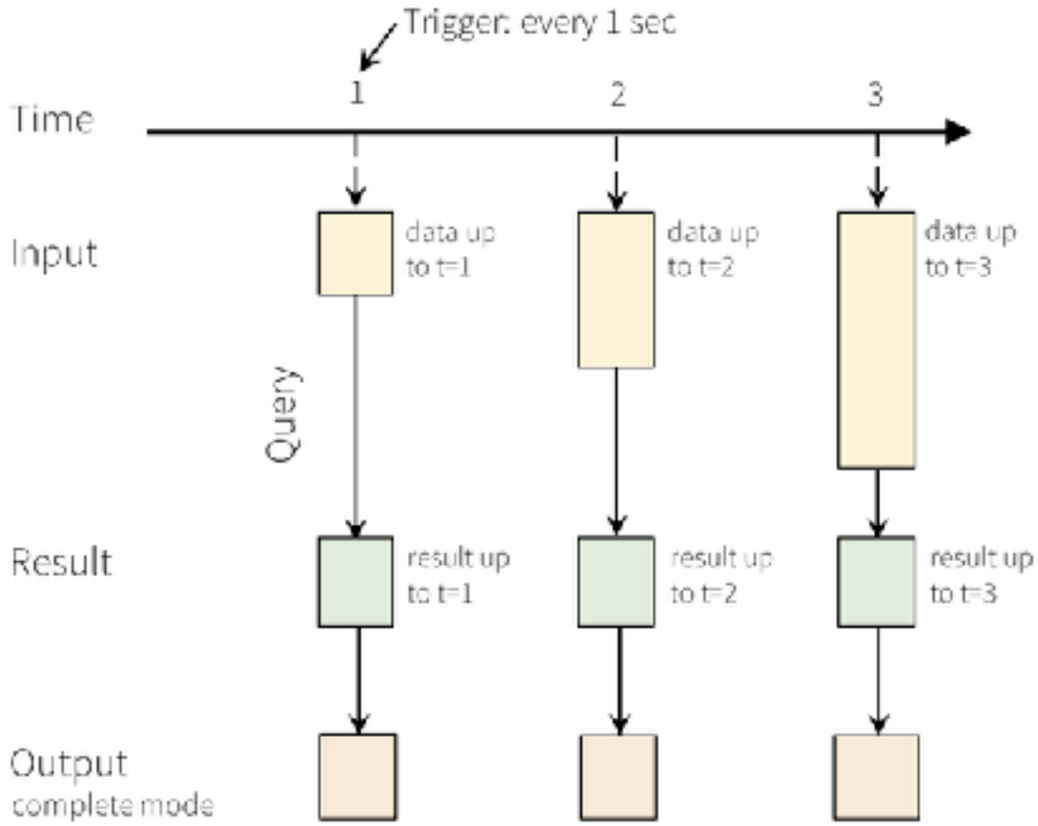
Data stream as an unbounded table

Spark Structure Streaming

- **Complete mode** :
  Enregistre l'ensemble du tableau résultat

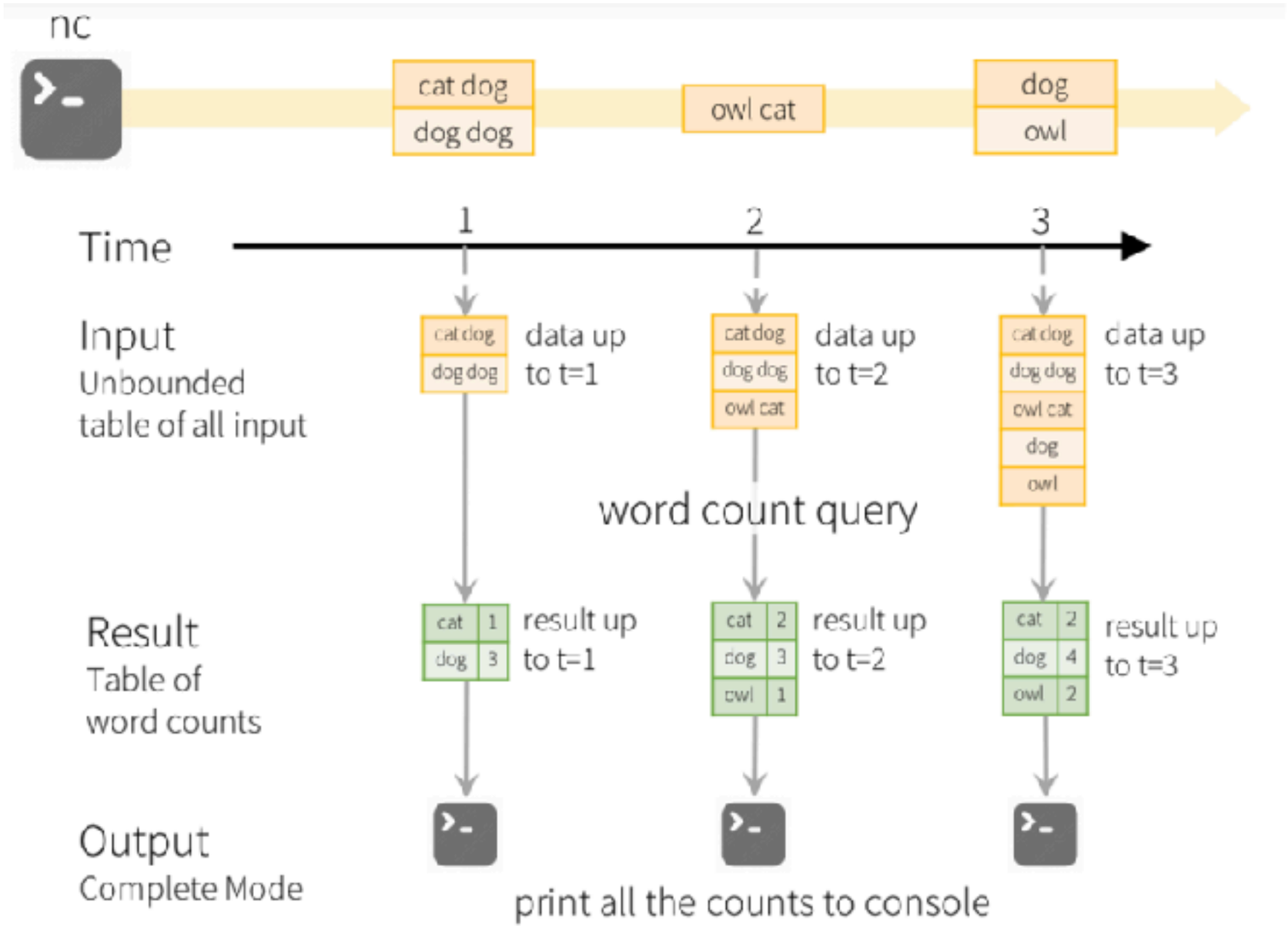
- **Append Mode** :
  Enregistre que les nouvelles lignes

- **Update mode** :
  Enregistre que les lignes mises à jour



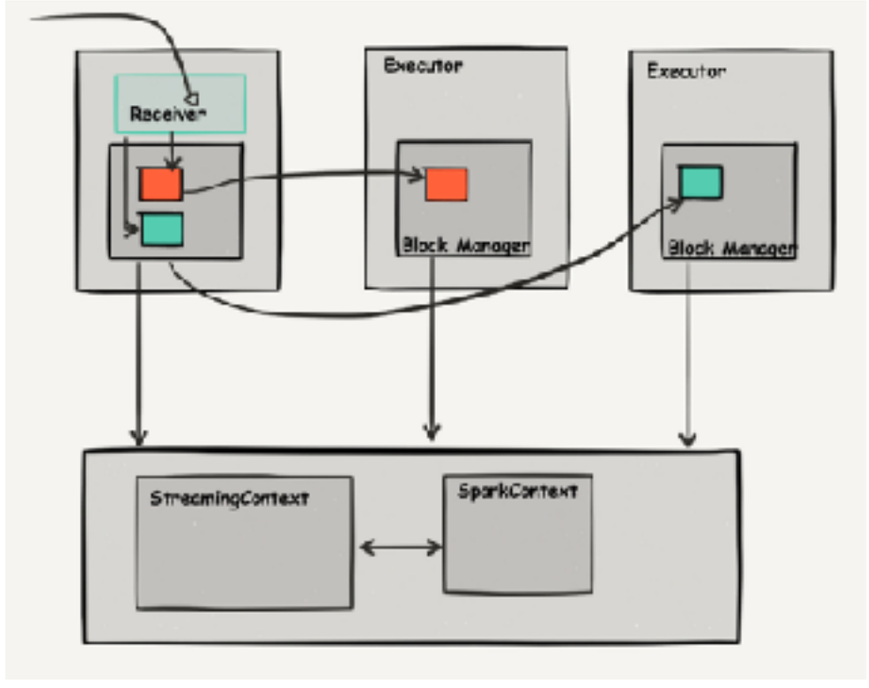
Programming Model for Structured Streaming

Spark Structure Streaming



Propriété de Spark Streaming

- Réplication des DStream
- Disponibilité du receiver



Intérêts de Spark Streaming

- Gère dynamiquement la charge des noeuds
- Tolérant à l’échec

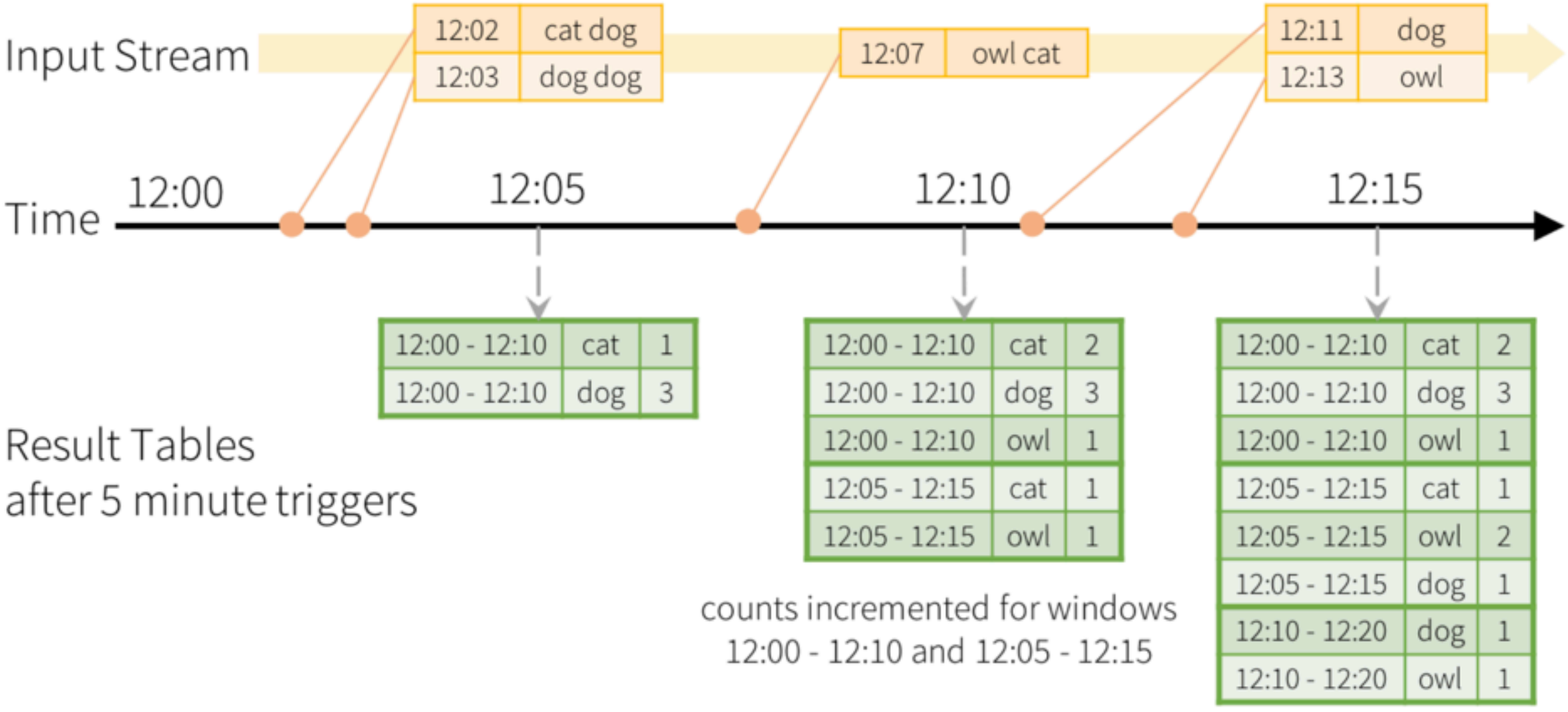
Limitation de Spark Streaming

- Receiver non fiable :
  - Pas de vérification de réception
  - Pas de récupération des données manquées
    - Perte de données possible
- Receiver custom en Scala/Java seulement

Spark Streaming

- TP

Fenêtrage



Result Tables
after 5 minute triggers

12:00 - 12:10	cat	1
12:00 - 12:10	dog	3

12:00 - 12:10	cat	2
12:00 - 12:10	dog	3
12:00 - 12:10	owl	1
12:05 - 12:15	cat	1
12:05 - 12:15	owl	1

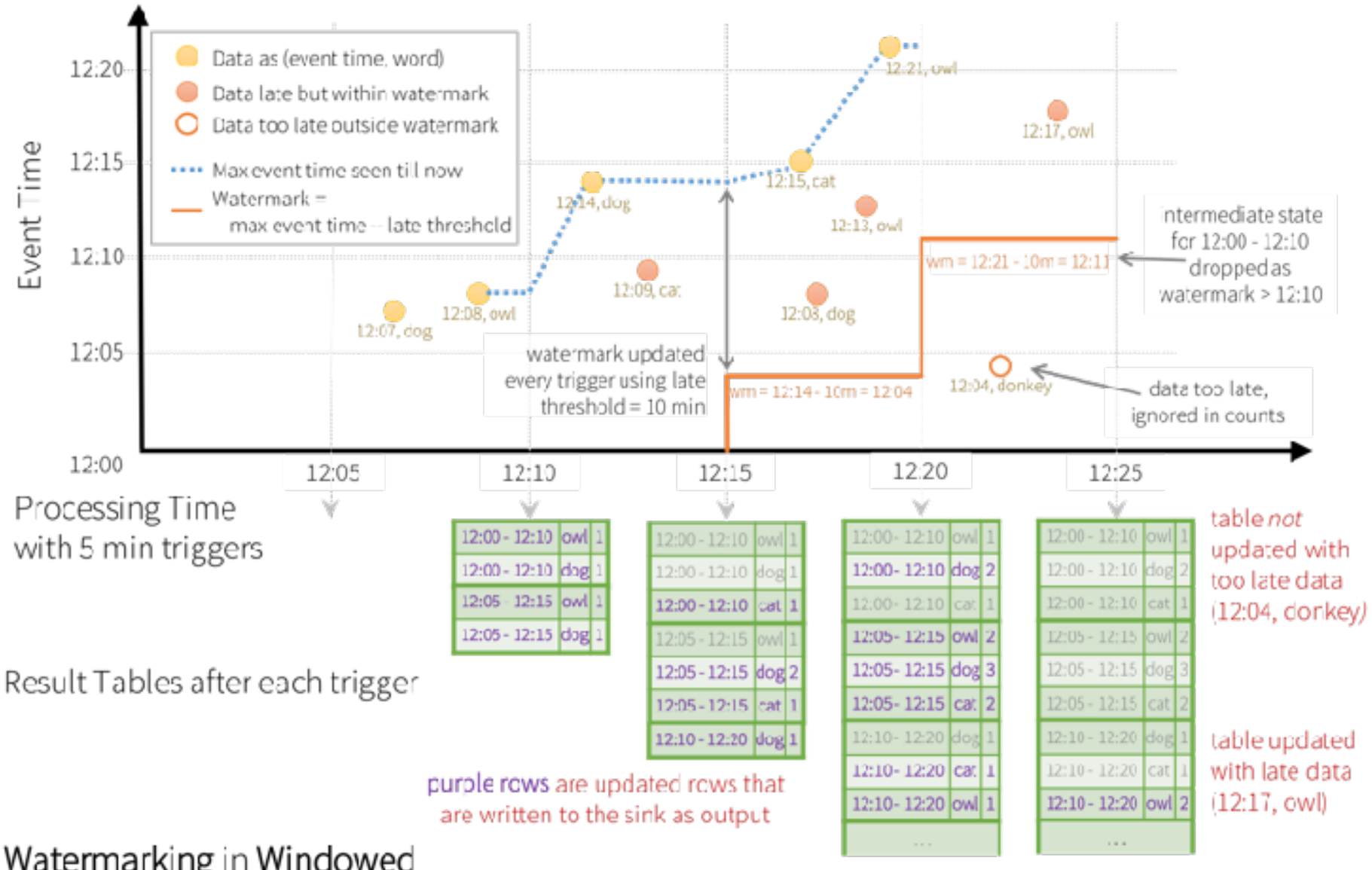
counts incremented for windows
12:00 - 12:10 and 12:05 - 12:15

12:00 - 12:10	cat	2
12:00 - 12:10	dog	3
12:00 - 12:10	owl	1
12:05 - 12:15	cat	1
12:05 - 12:15	owl	2
12:05 - 12:15	dog	1
12:10 - 12:20	dog	1
12:10 - 12:20	owl	1

counts incremented for windows
12:05 - 12:15 and 12:10 - 12:20

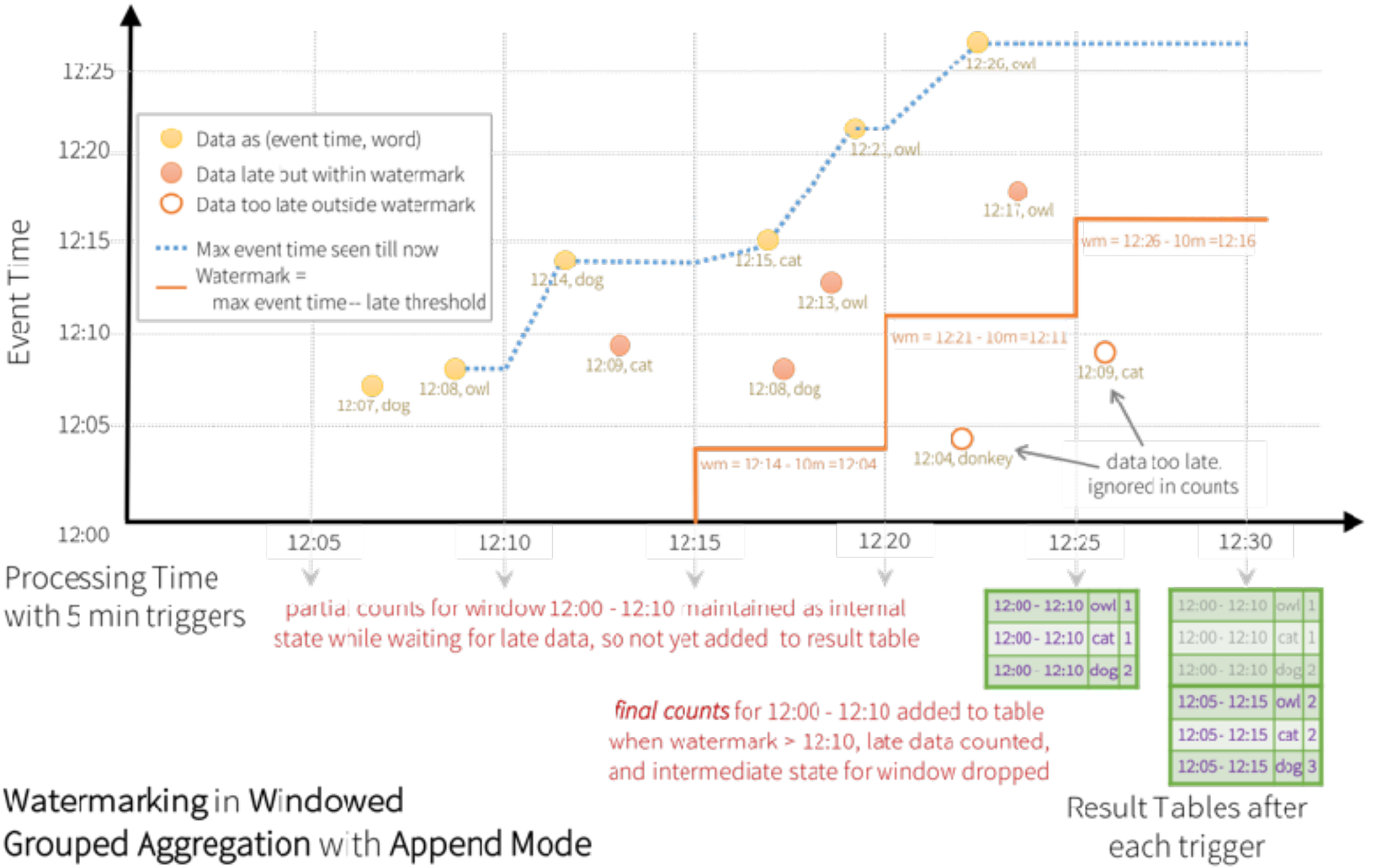
Windowed Grouped Aggregation
with 10 min windows, sliding every 5 mins

Fenêtrage (update mode)



Watermarking in **Windowed**
Grouped Aggregation with **Update Mode**

Fenêtrage (append mode)



Watermarking in **Windowed Grouped Aggregation** with **Append Mode**