Enriching the data vs Filtering in Spark

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Card Loyalty,CapitalOne

CapitalOne

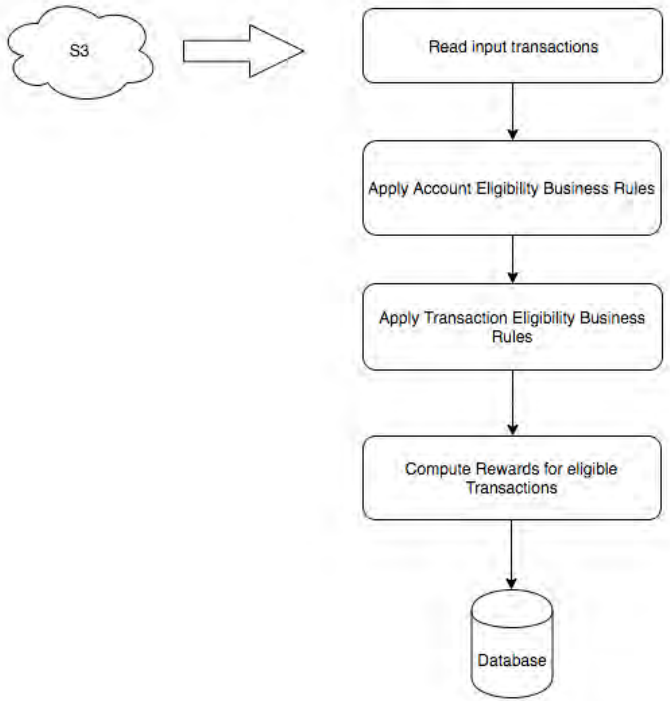
- CapitalOne is the **first U.S Bank** to exit **on-prem legacy data centers** and go all in on the cloud
- CapitalOne is a Tech Company doing **Banking**
- CapitalOne is **Founder-Led** company on mission to change banking for good
- Giving back to the community
  - Open source - 20+ projects like Criticalstack,Rubicon,Dataprofiler
  - CODERS
  - CODA

Agenda

- Loyalty use case in CapitalOne
- Filtering Approach
- Issues with Filtering Approach
- How Enriching approach solves the issue
- Conclusion & Questions

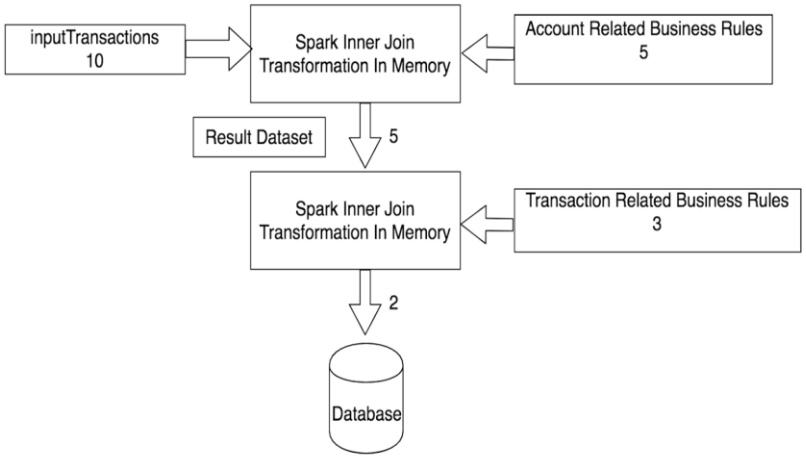
Loyalty Use case in CapitalOne

- Use case
  - One of Core Credit Card Rewards Spark Application.
  - Consumes daily credit card transactions and computes the Rewards

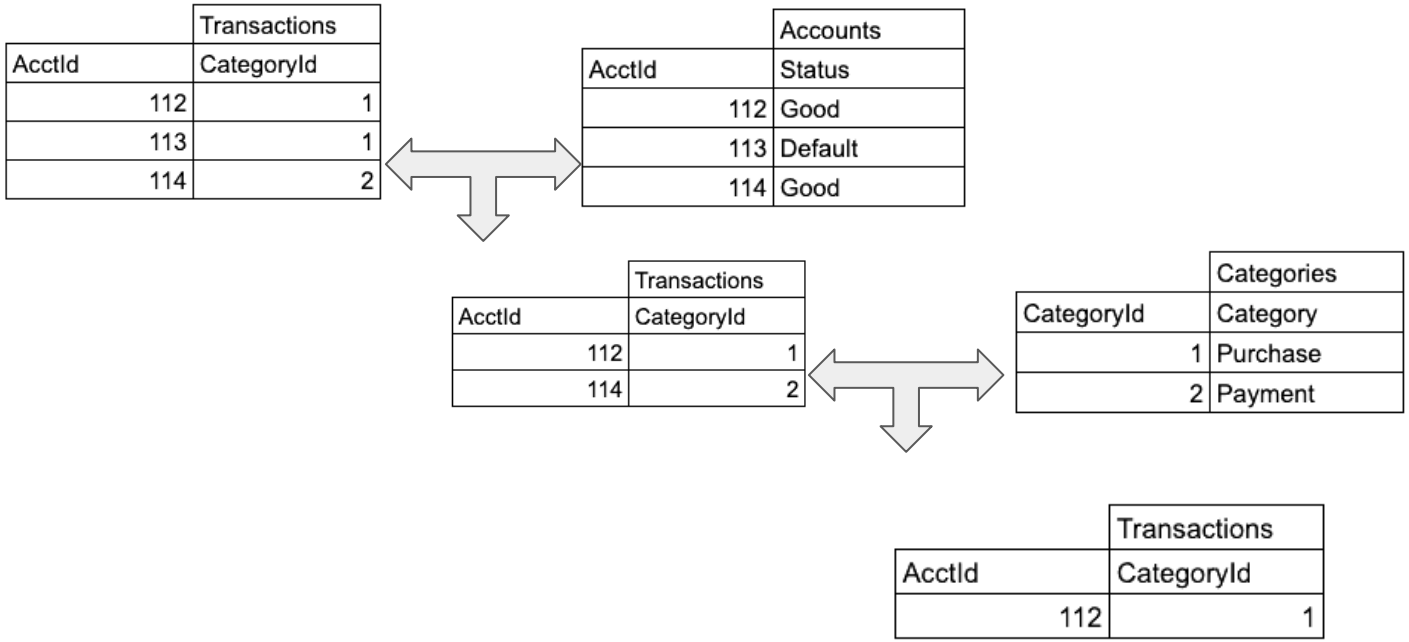


Filtering the data Approach

- This approach uses Spark inner-join at each stage



Filtering Approach Example



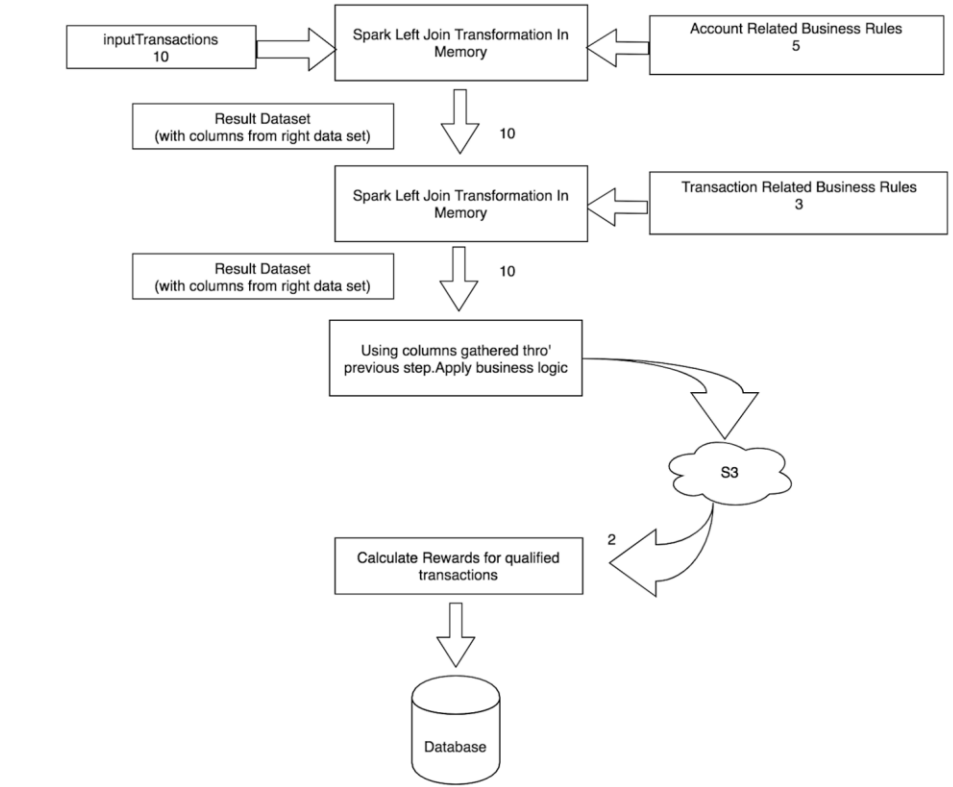
Issues with Filtering Approach

- Hard to debug the application post deployment
- Back tracing of data is not possible as computation happens in-memory
- Counts at each stage can only provide how many got processed.But not why the remaining got dropped in that stage.

How did we overcome these issues ?

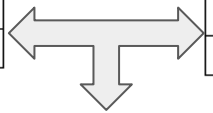
Enriching the data approach

- This approach uses Spark left-outer join
- Instead of filtering the data from dataset at each stage.Enriching approach keeps enriching the data from right side dataset



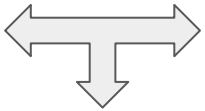
Enriching Approach Example

	Transactions
AcctId	CategoryId
112	1
113	1
114	2



	Accounts
AcctId	Status
112	Good
113	Default
114	Good

	Transactions	
AcctId	CategoryId	Status
112	1	Good
113	1	Default
114	2	Good

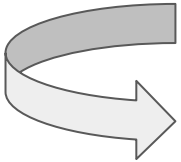


	Categories
CategoryId	Category
1	Purchase
2	Payment

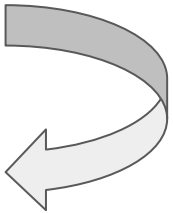
	Transactions		
AcctId	CategoryId	Status	Category
112	1	Good	Purchase
113	1	Default	Purchase
114	2	Good	Payment

Enriching Approach Example…….

	Transactions		
AcctId	CategoryId	Status	Category
112	1	Good	Purchase
113	1	Default	Purchase
114	2	Good	Payment



	Transactions			
AcctId	CategoryId	Status	Category	isEligibleForNextStage
112	1	Good	Purchase	TRUE
113	1	Default	Purchase	FALSE
114	2	Good	Payment	FALSE



	Transactions
AcctId	CategoryId
112	1

Advantage of Enriching over filtering

- Data from each stage is enriched into original dataset.It captures the state information,makes it easy to debug/analyse later

- Same data columns/flags captured at each stage gives more granular details to know why particular data got dropped at that stage

- No need of additional costly counts action at each stage.

Conclusion

- We made the switch to use Enriching approach in our Spark job in production.
- It is successfully processing millions of credit card transaction daily.
- Awarding millions of miles,cash and points as Rewards to Capital One customers.

About me - Gokul Prabagaren

- Engineering Manager @ Capitalone
- Been building Software Applications since initial versions of Java and Spark
- Tech Speaker and Contributor to @CapitalOneTech Medium blogs on Big Data processing
- @gocoolp on LinkedIn
- @gocool_p on Twitter


Thank You
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Dankscheen
спасибо
Kam Sah Hammida
ارکش
Manana
Dankon
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Matondo
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Mauruuru
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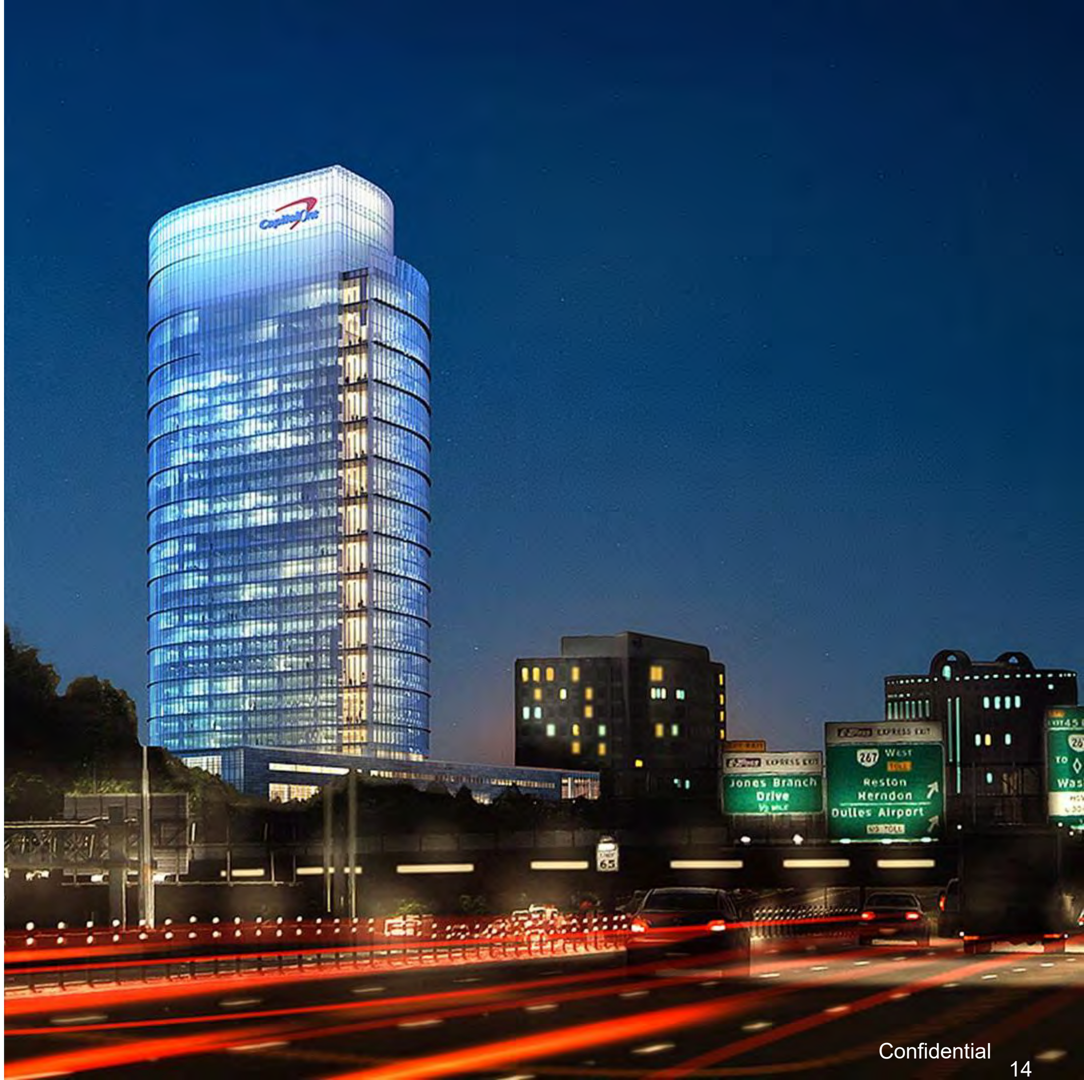
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