Beam Concepts Review

Israel Herraiz

Strategic Cloud Engineer,
Google Cloud

Agenda

Course Intro

Beam Concepts Review

Windows, Watermarks, and Triggers

Sources and Sinks

Schemas

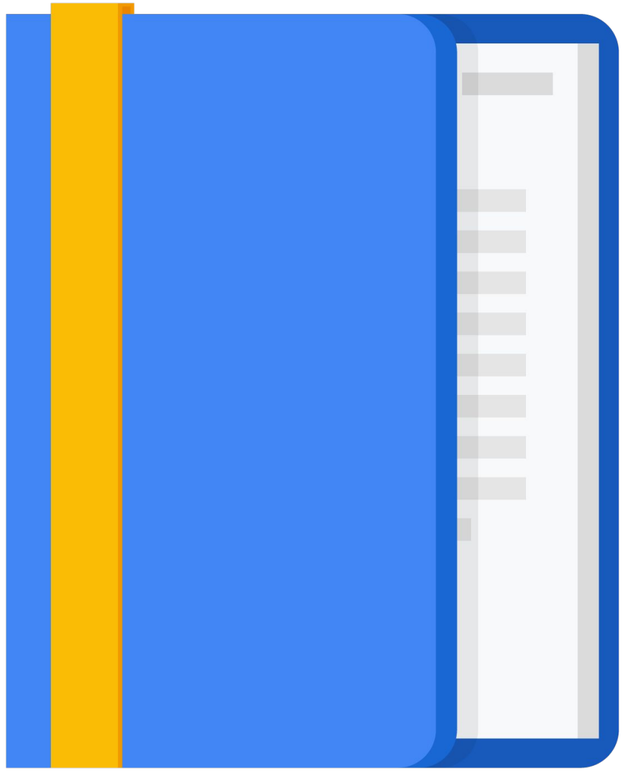
State and Timer

Best Practices

SQL and DataFrames

Beam Notebooks

Summary



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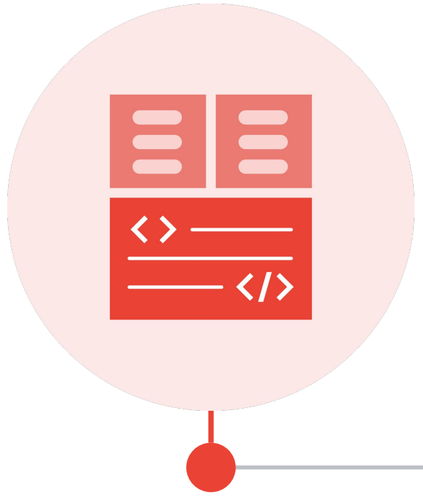
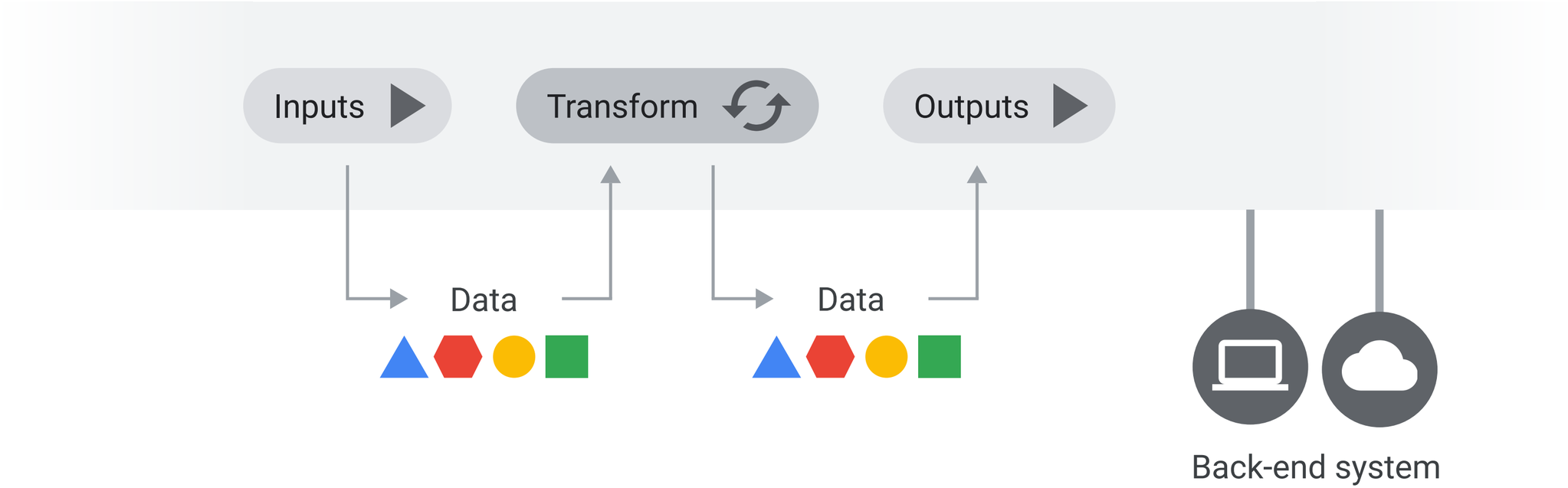


Beam basics

Utility transforms

DoFn lifecycle

Apache Beam = Batch + stream



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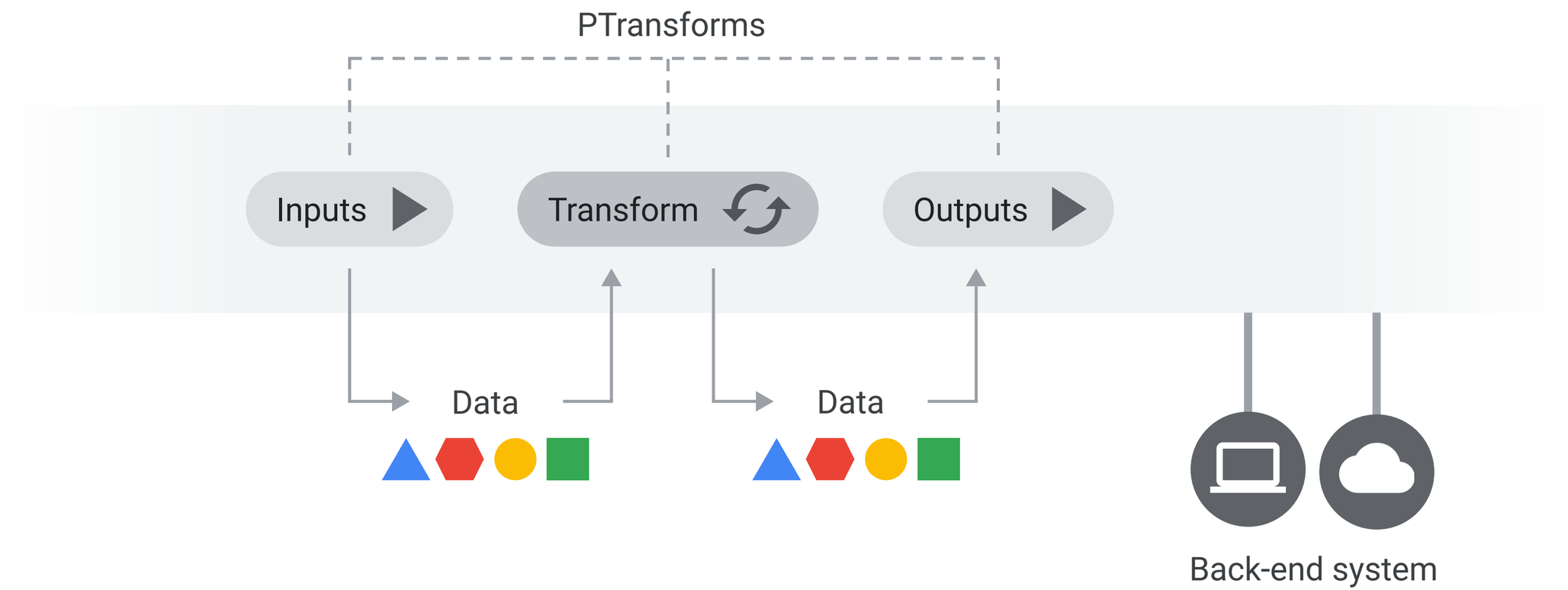

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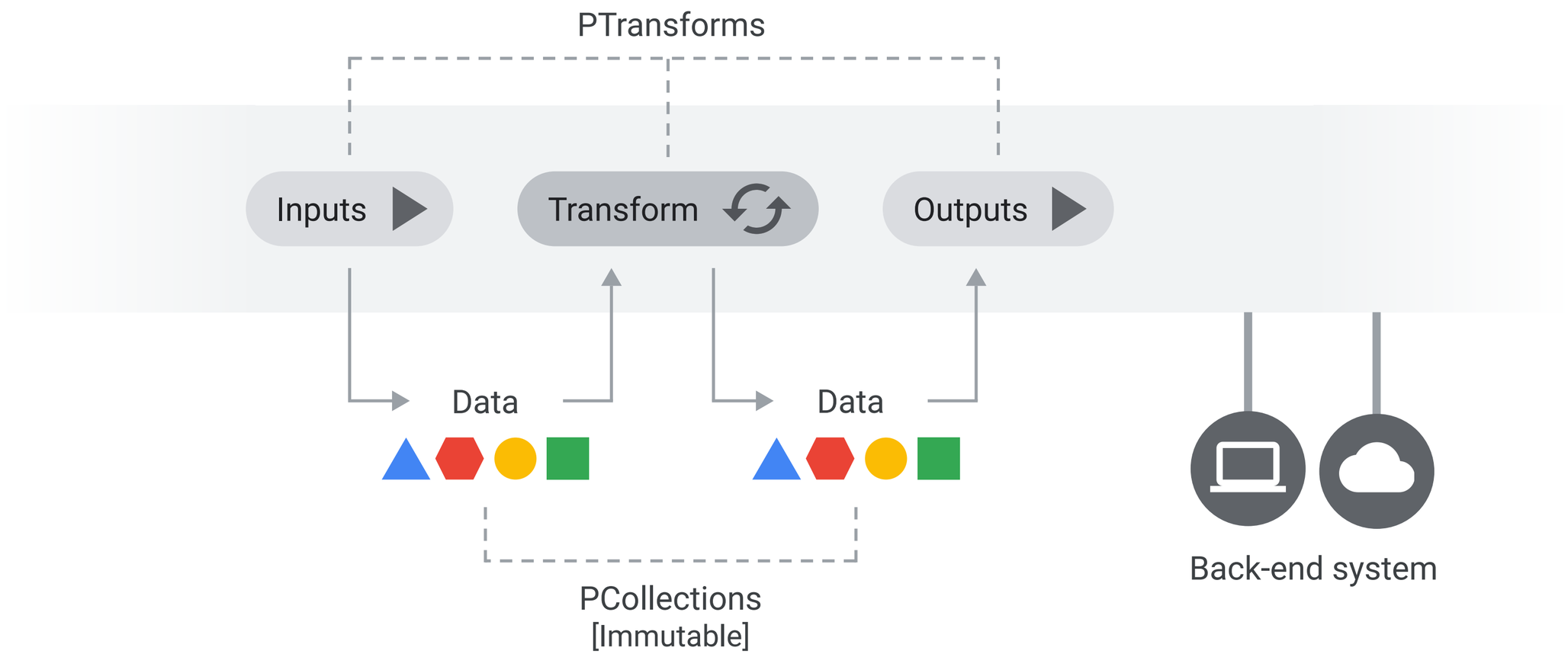

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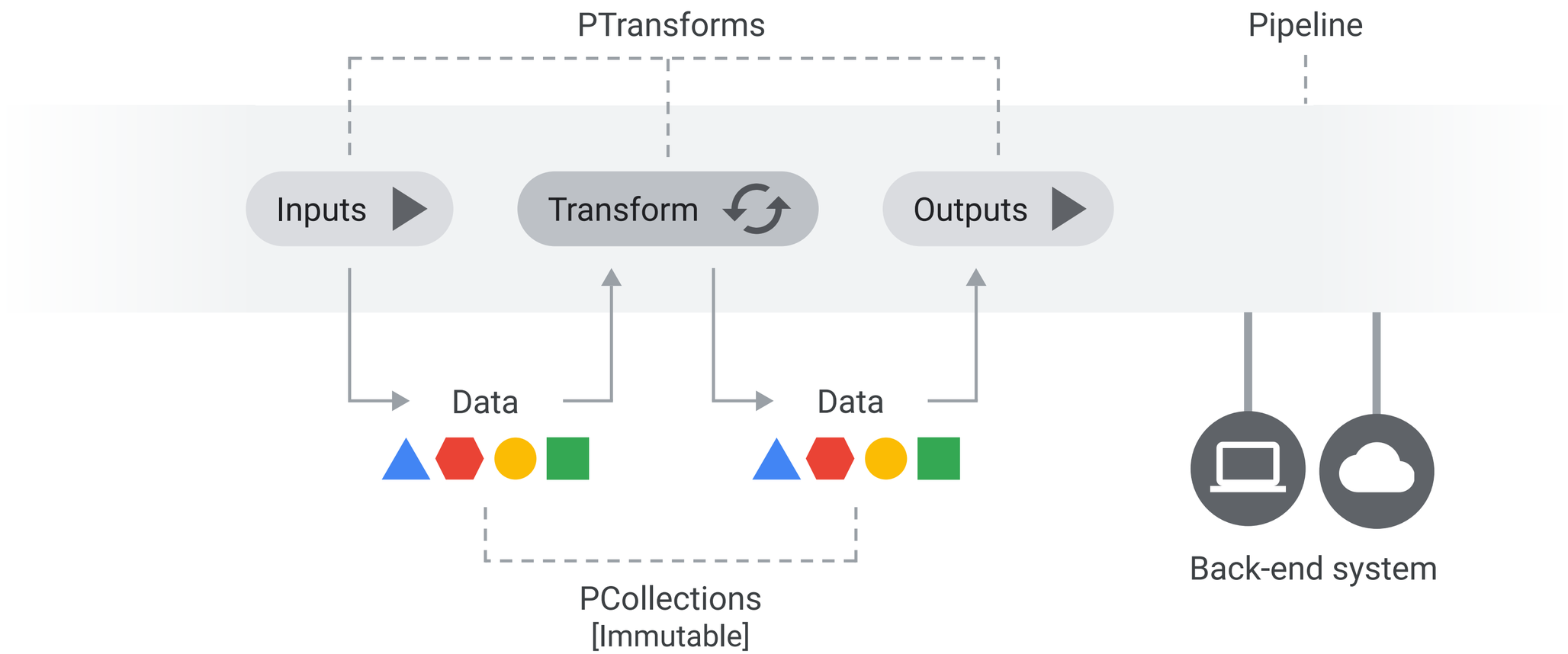

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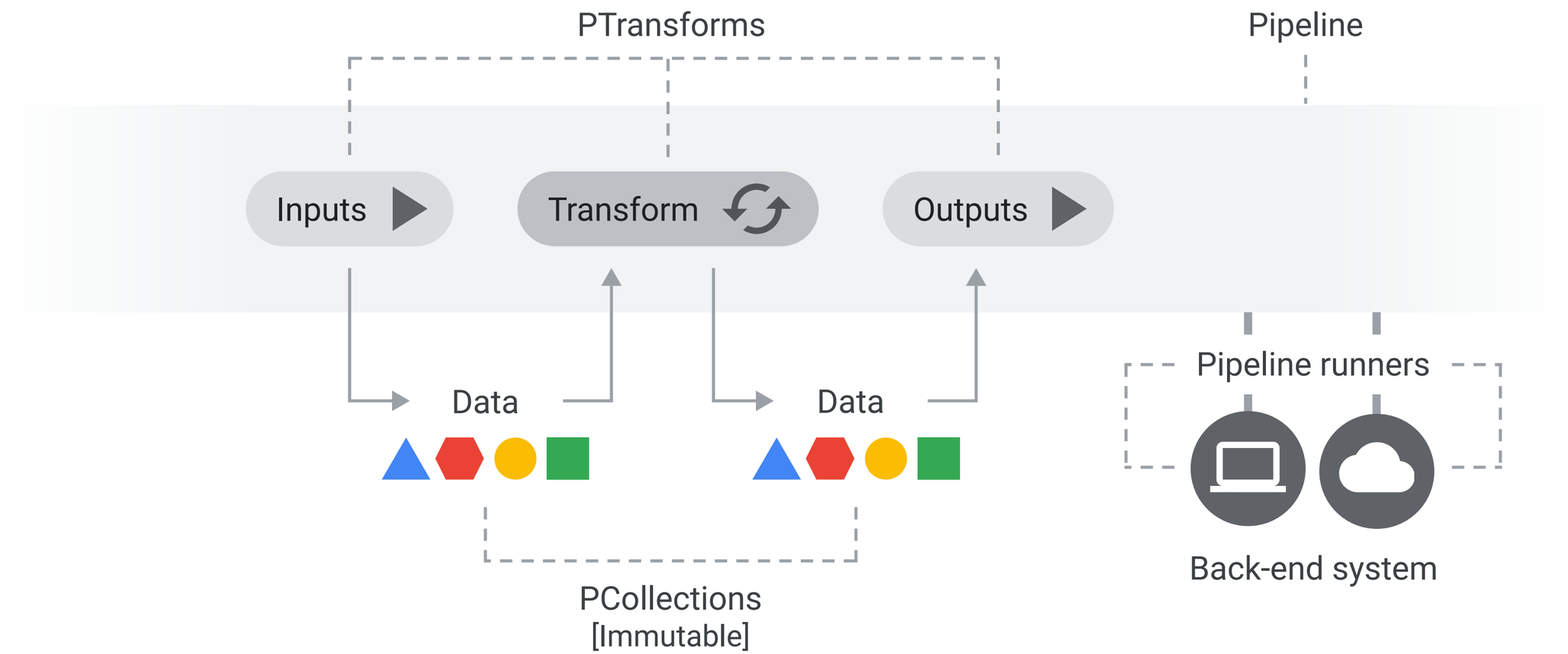

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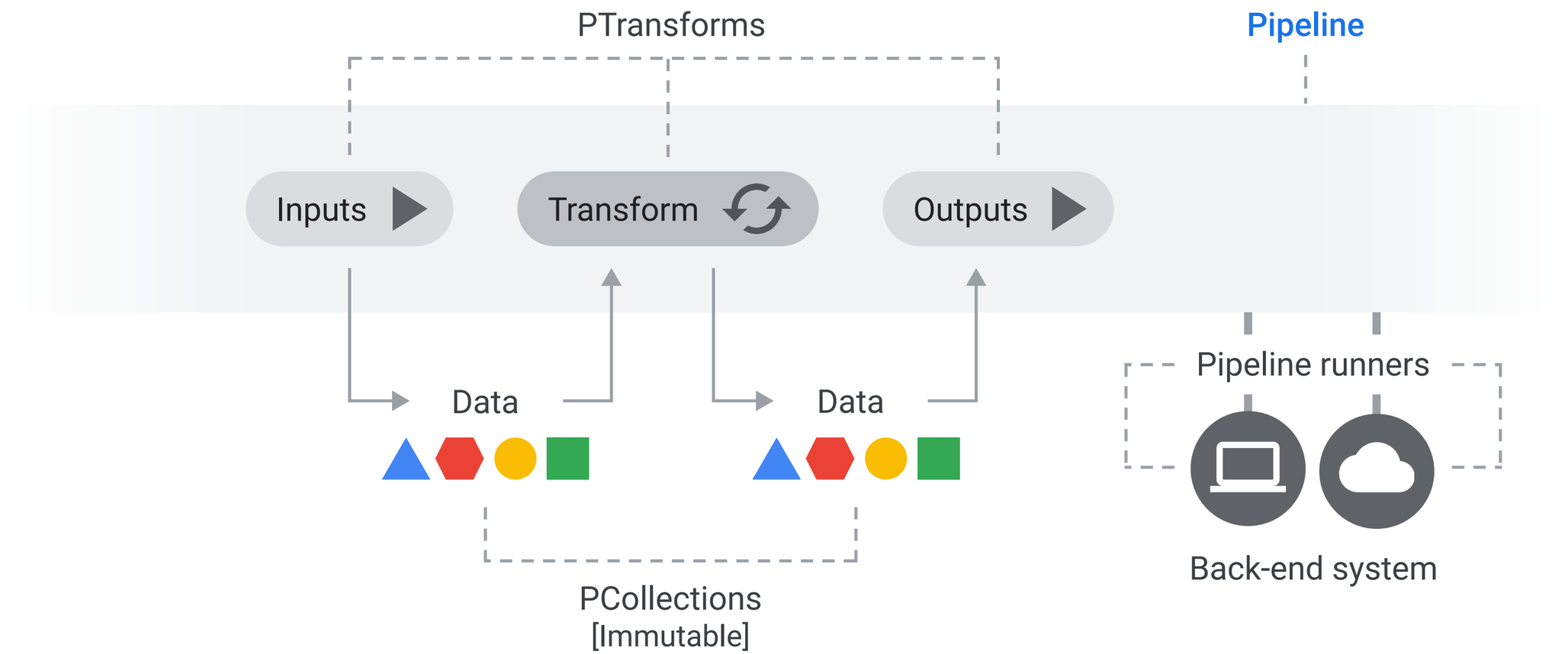

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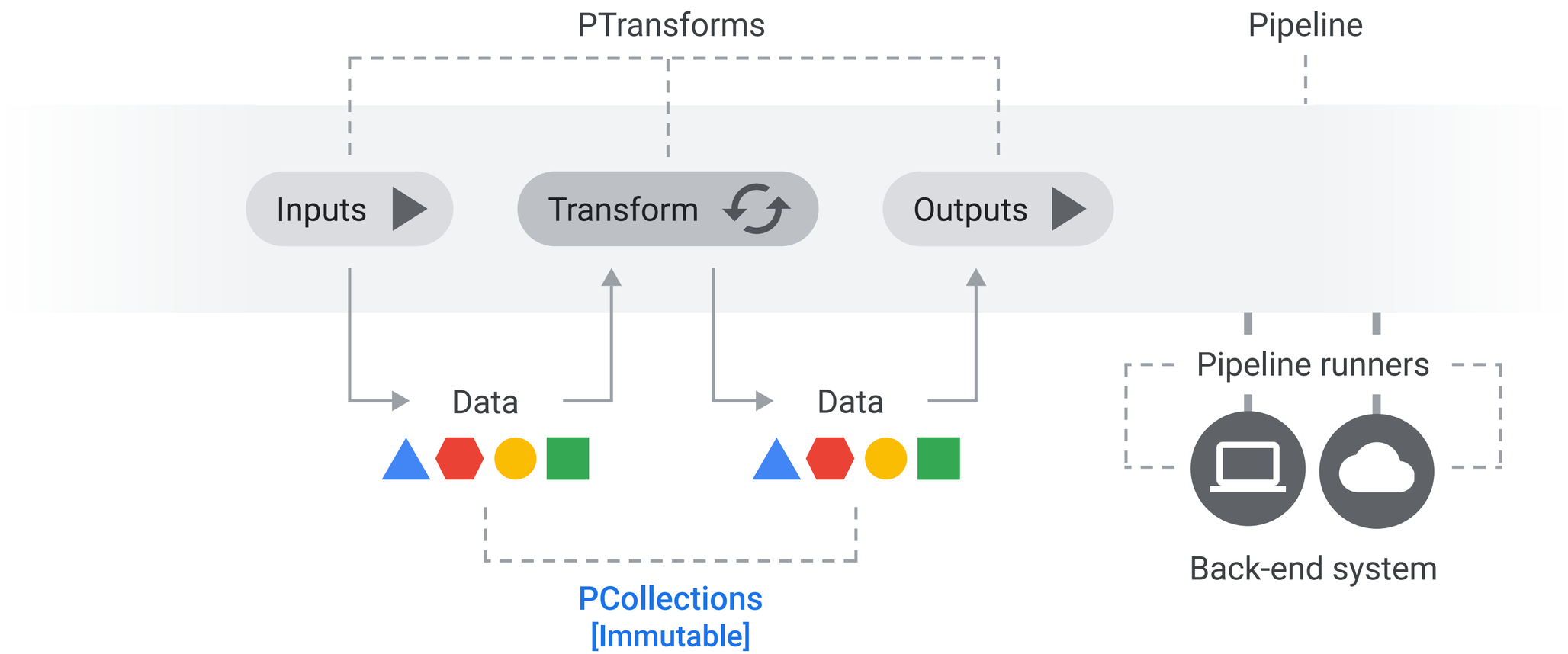

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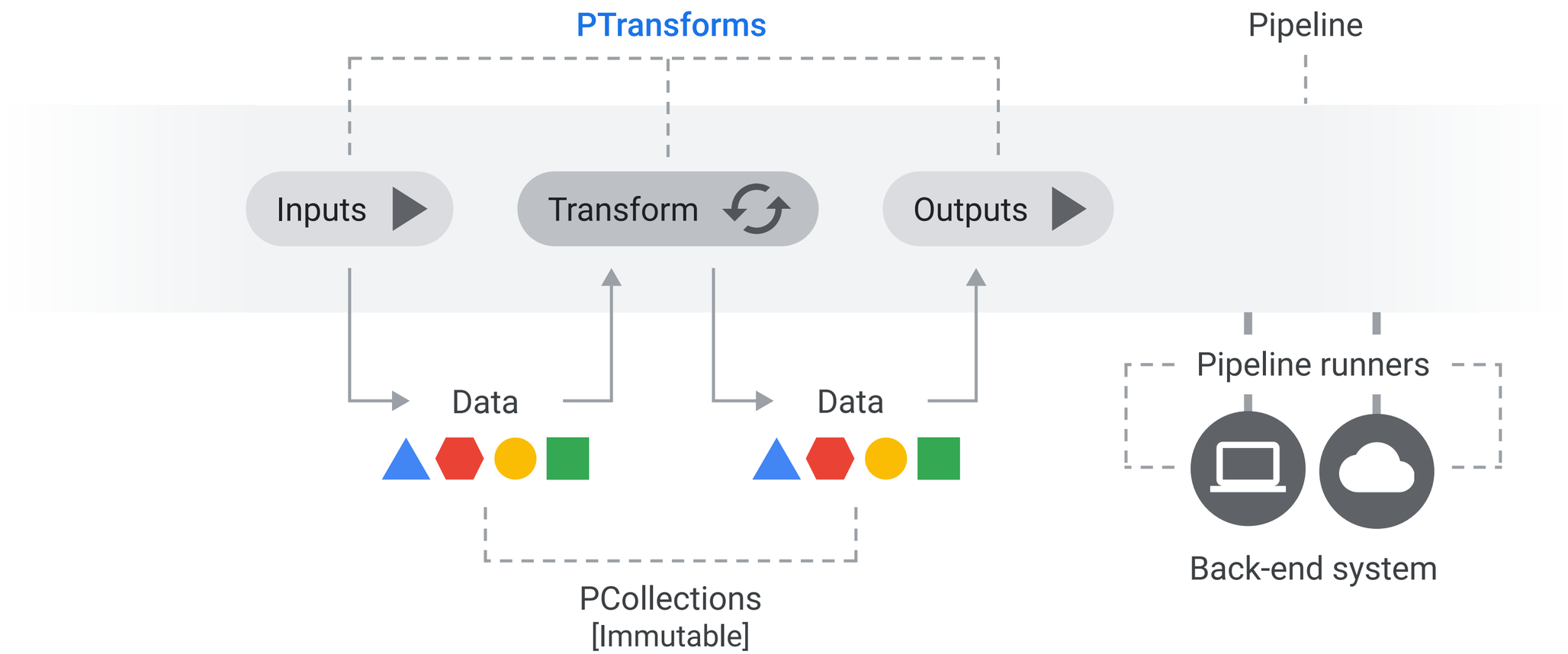

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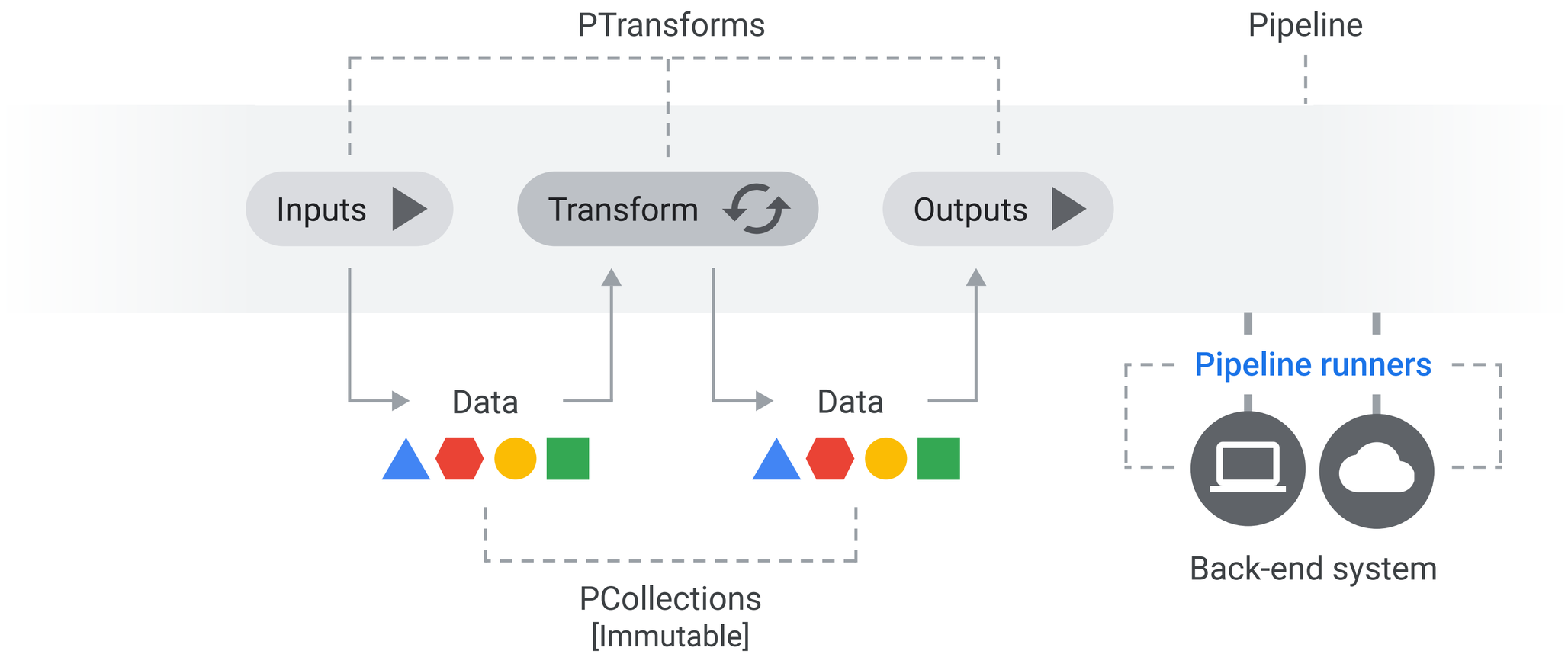

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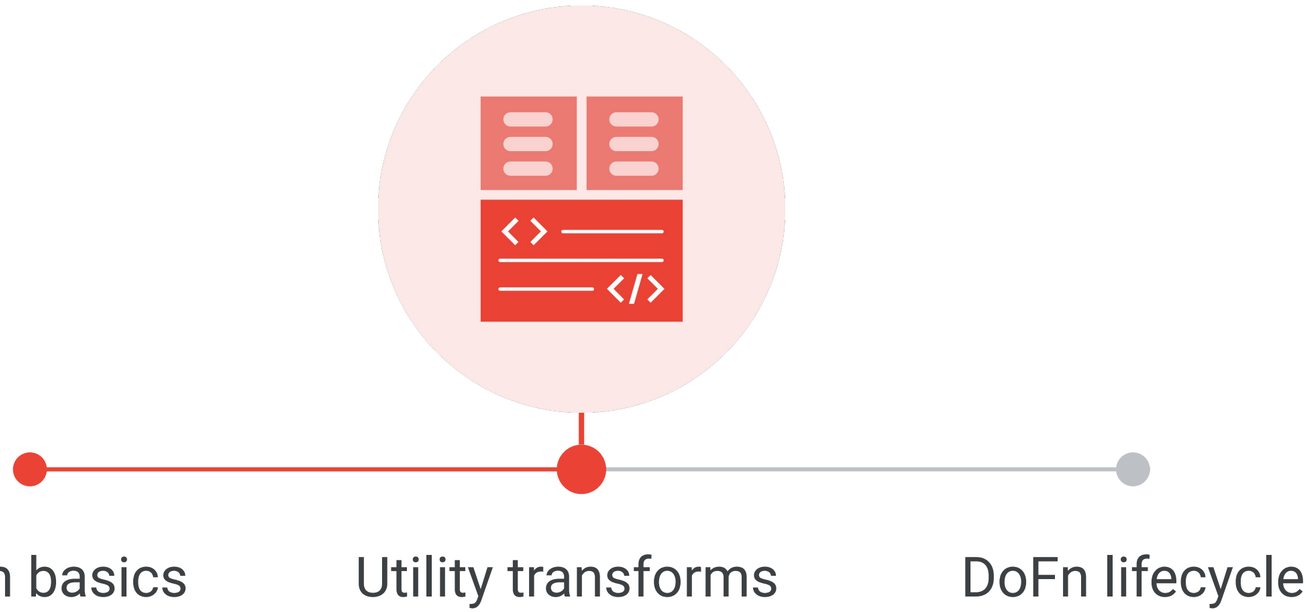

Transforms

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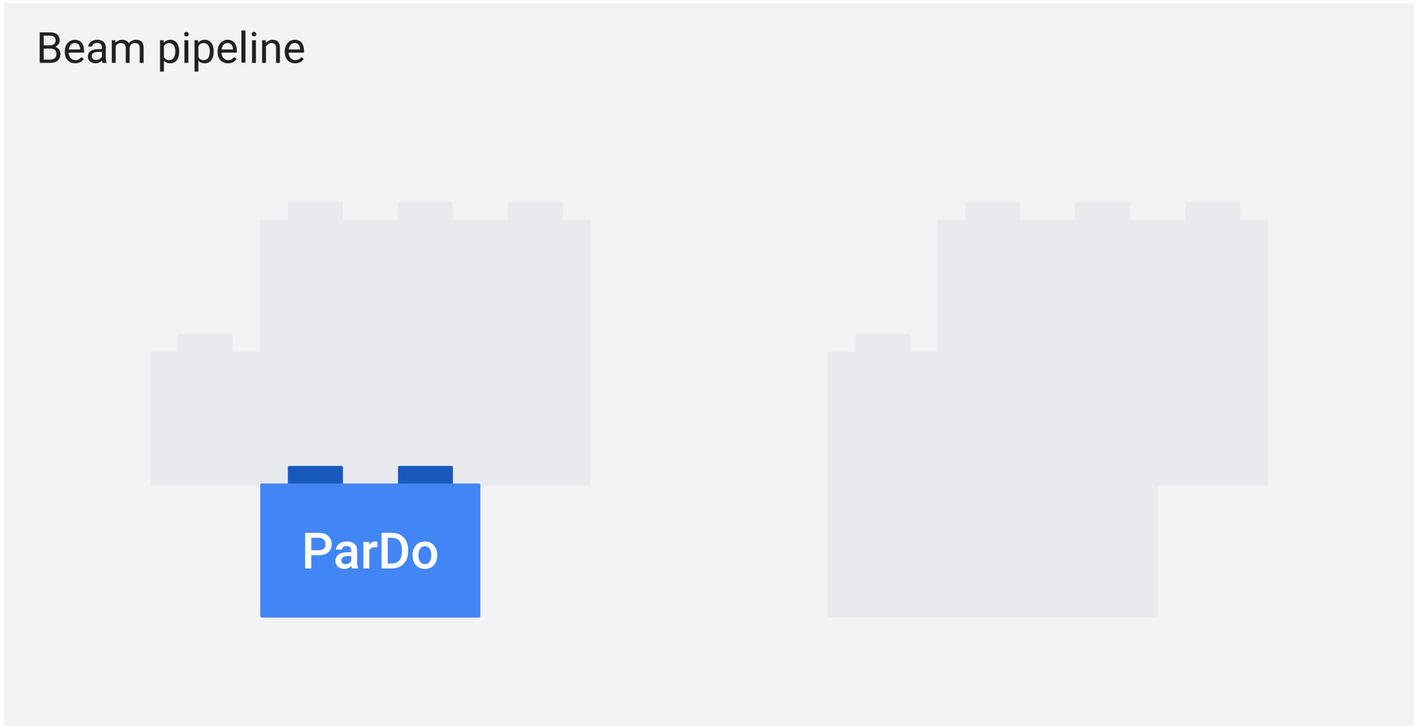

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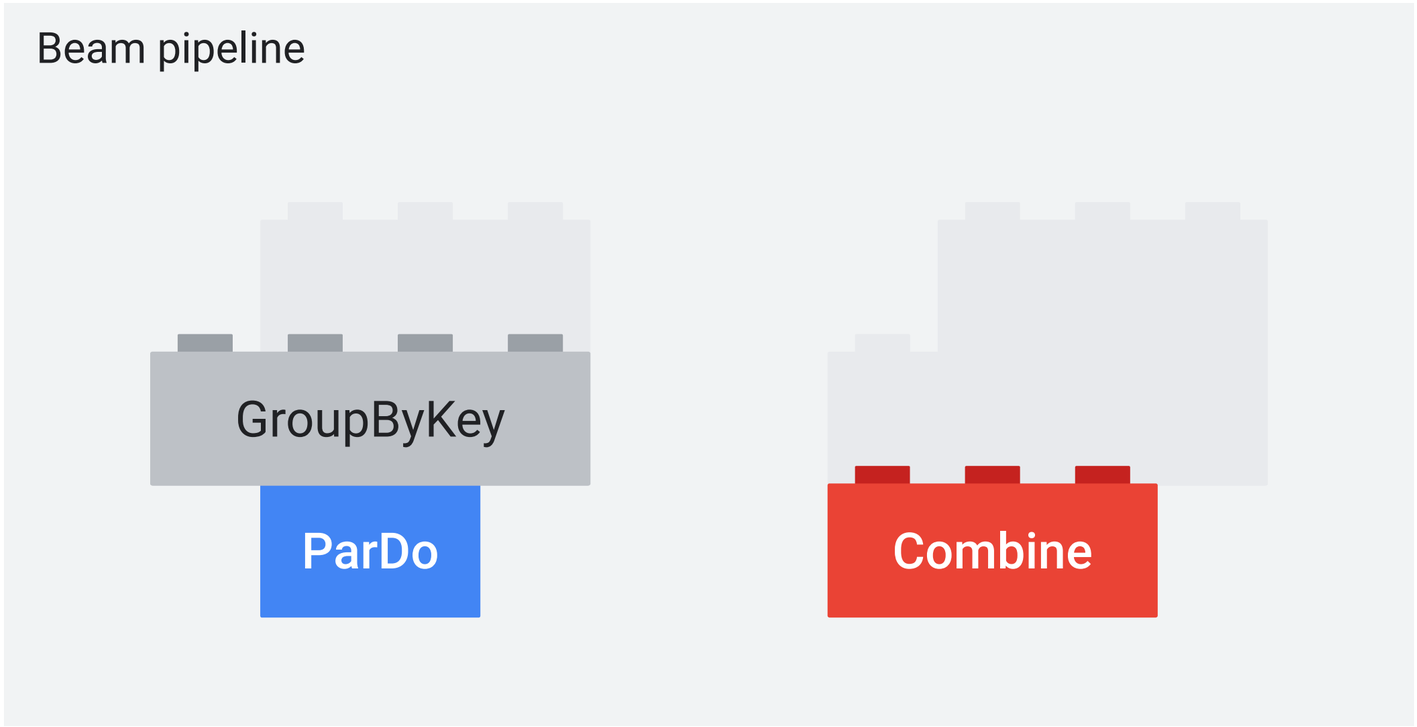

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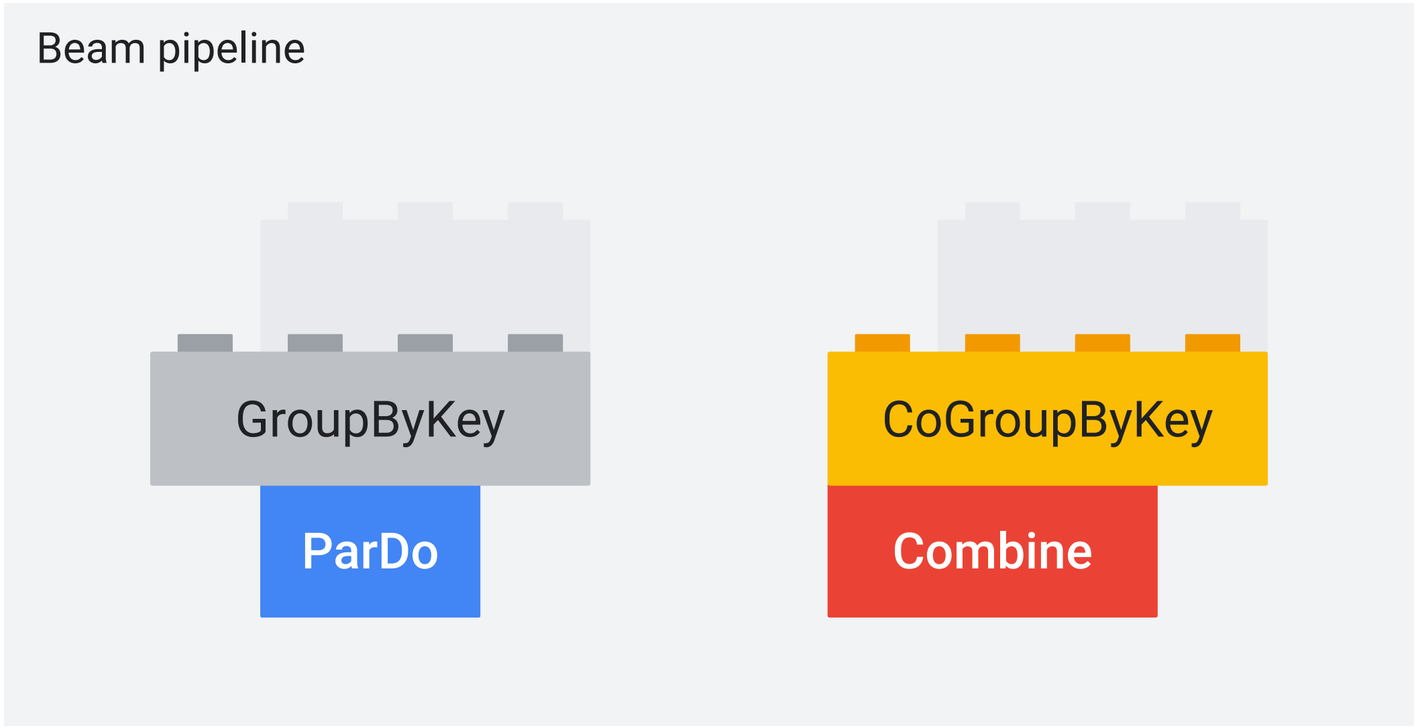

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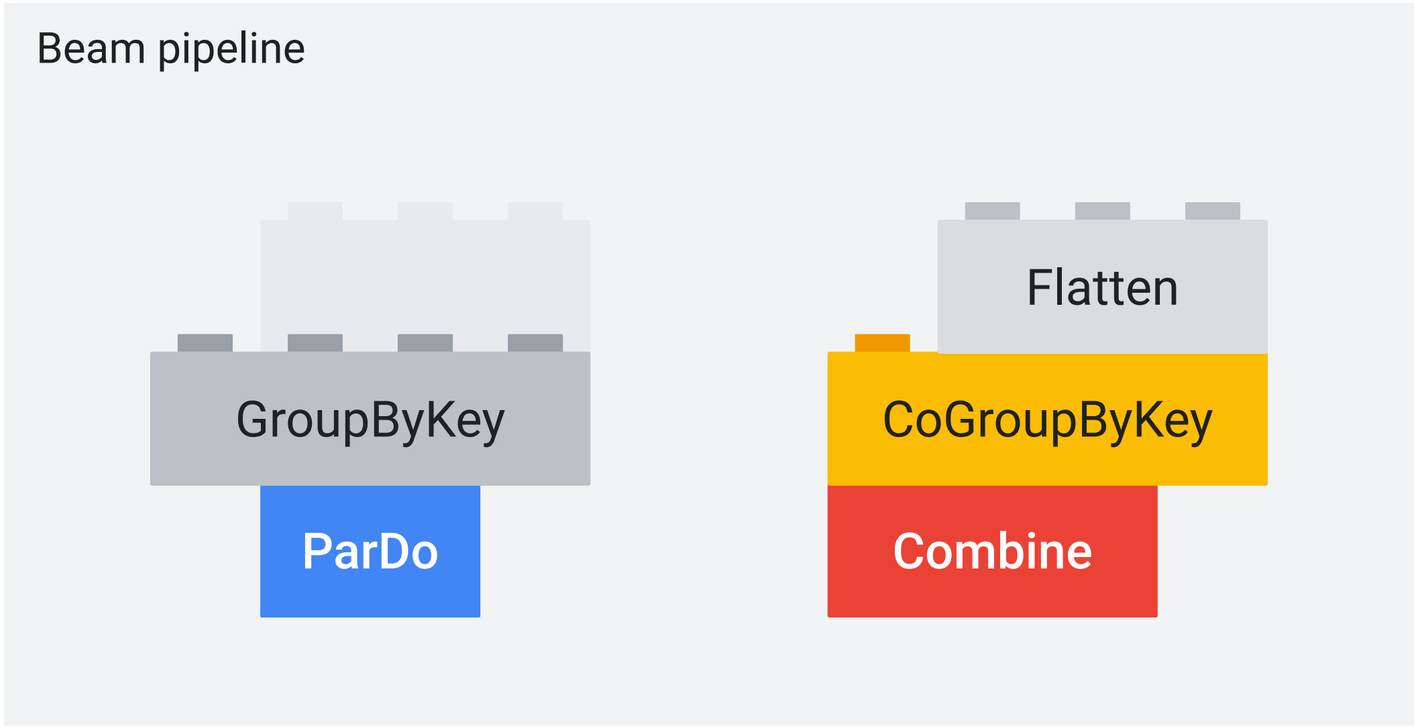
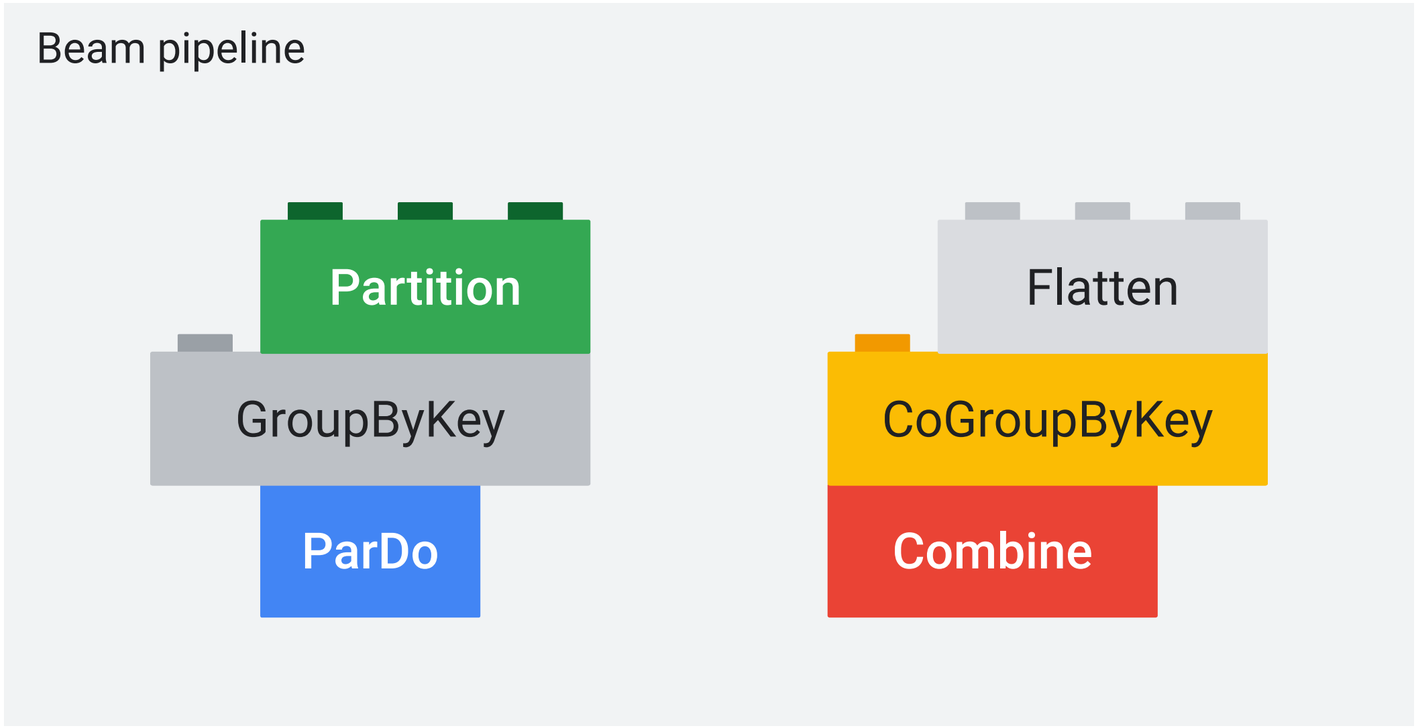

Beam pipeline
GroupByKey
ParDo
Flatten
CoGroupByKey
Combine

Transforms


Beam pipeline
Partition
GroupByKey
ParDo
Flatten
CoGroupByKey
Combine

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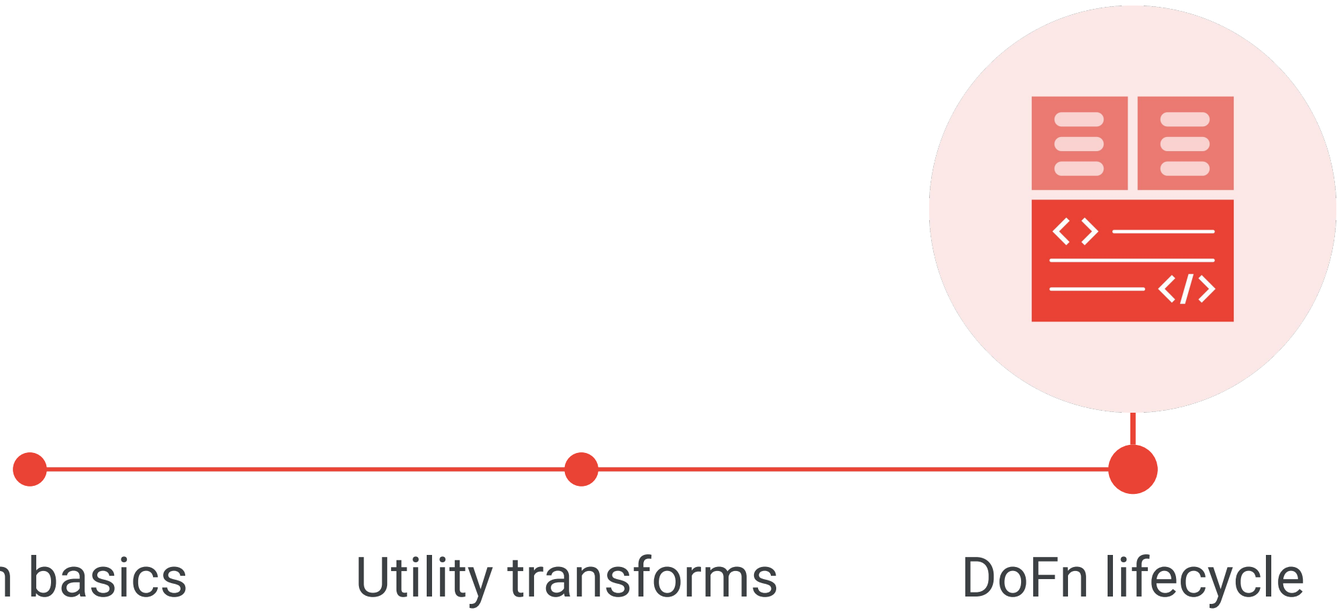

Friends of ParDo

	Input	Output	Side inputs and side outputs
ParDo	**1**	**0, 1 or many**	✓
Filter	1	0 or 1	✗
MapElements	1	1	✗
FlatMapElements	1	0, 1 or Many	✗
WithKeys	value	(f(value), value)	✗
Keys	(key, value)	key	✗
Values	(key, value)	value	✗

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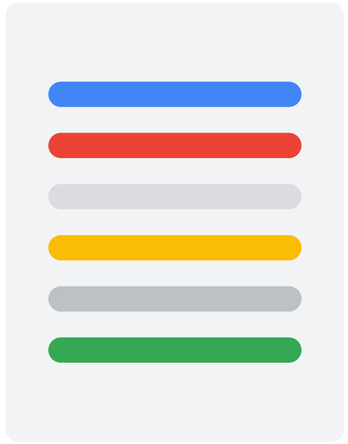
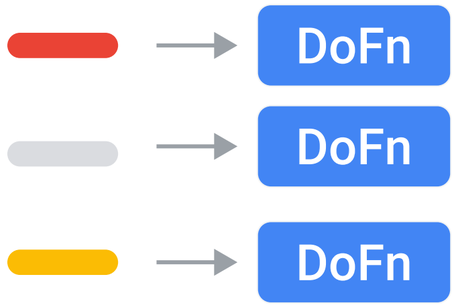
Keys	(key, value)	key	✗
Values	(key, value)	value	✗

Data bundles





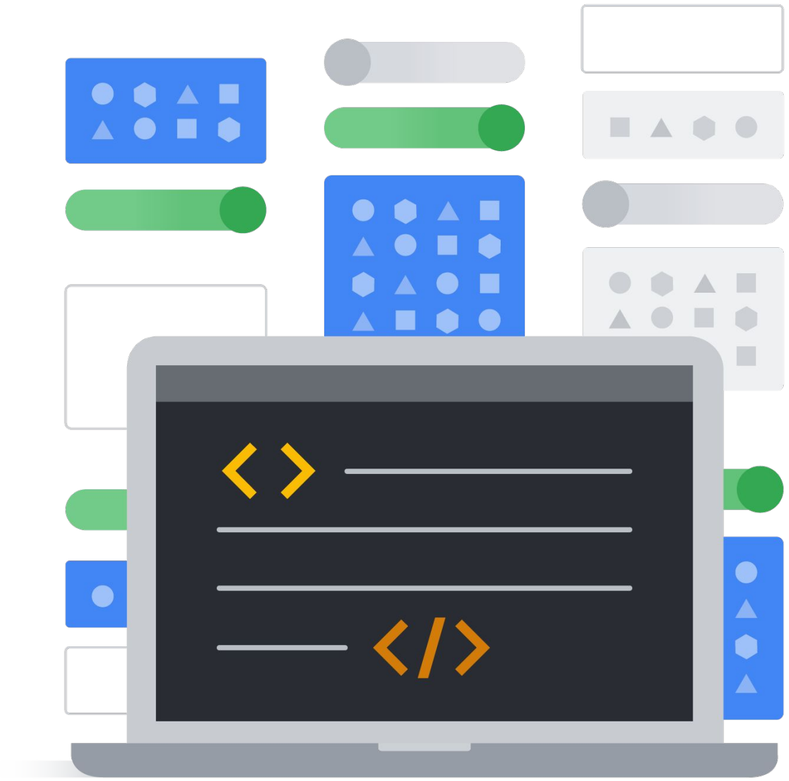
Worker receives bundles of work

Each bundle is passed to a DoFn object

Many DoFns can be running at the same time within the same process

Methods of DoFn

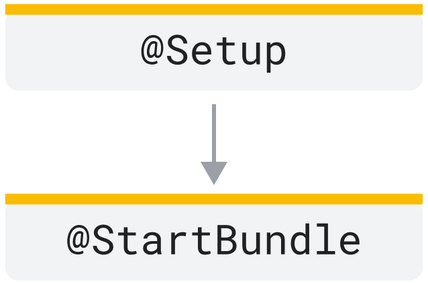
```
class MyDoFn(beam.DoFn):
    def setup(self):
        pass
    def start_bundle(self):
        pass
    def process(self, element):
        pass
    def finish_bundle(self):
        pass
    def teardown(self):
        pass
```



The lifecycle of a DoFn

```
@Setup
```

The lifecycle of a DoFn



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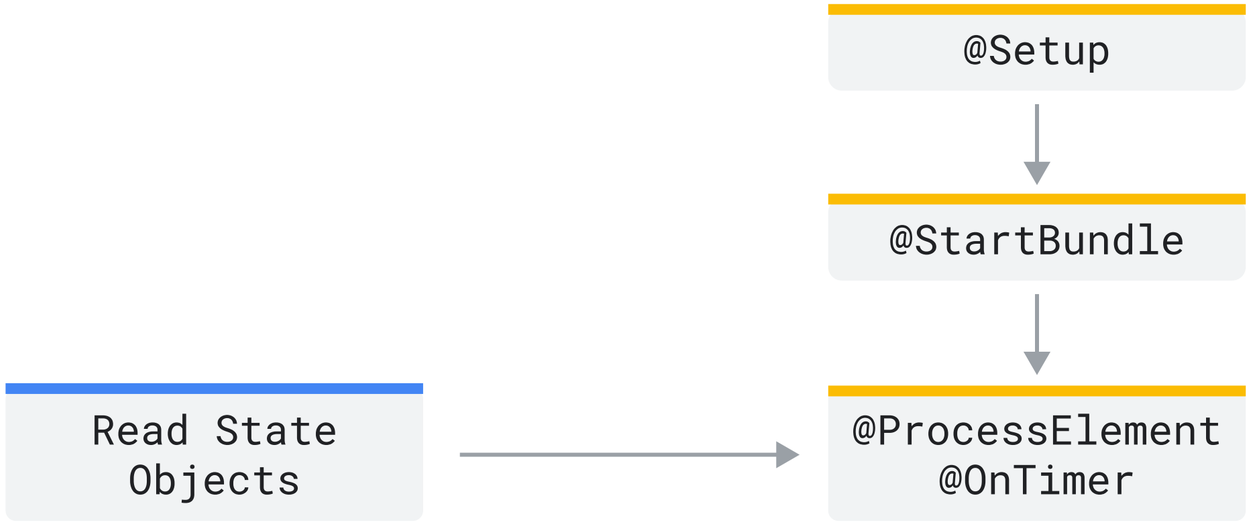

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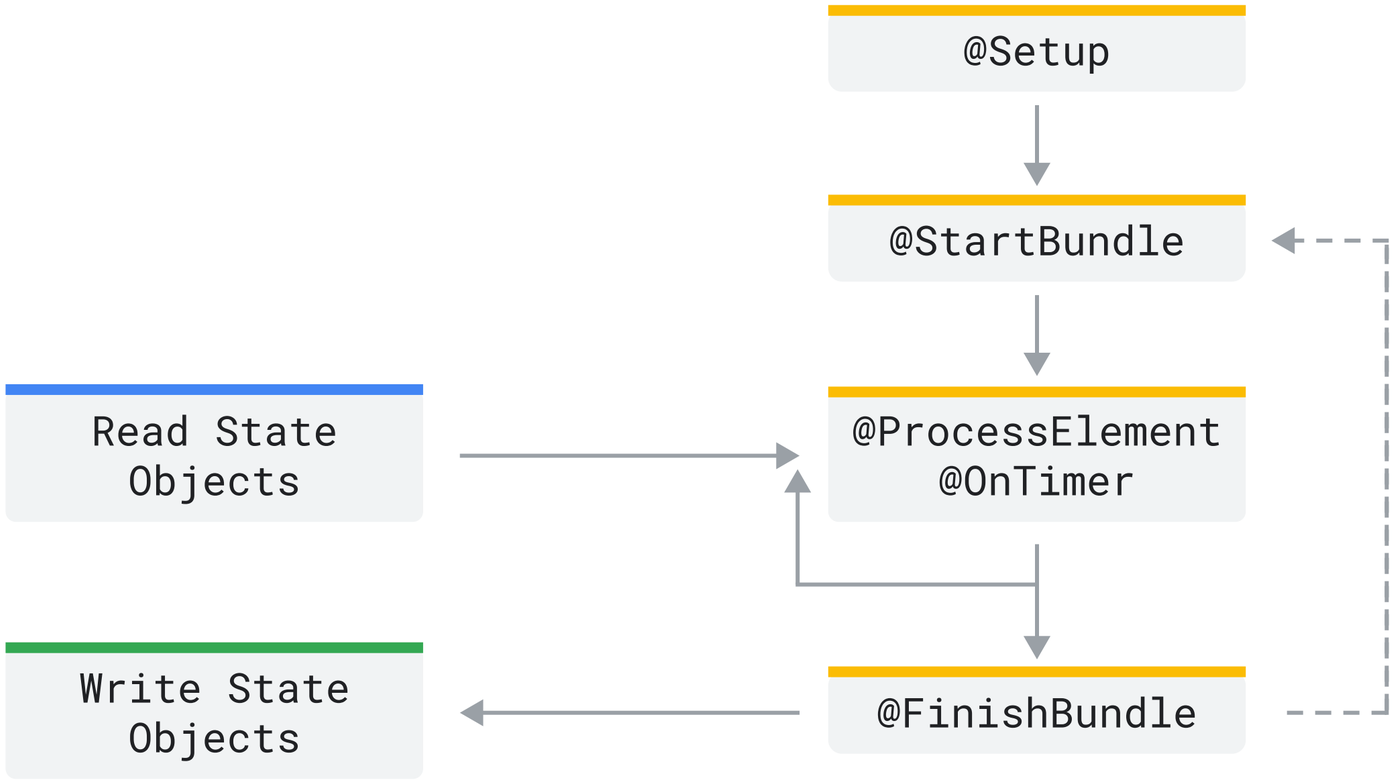
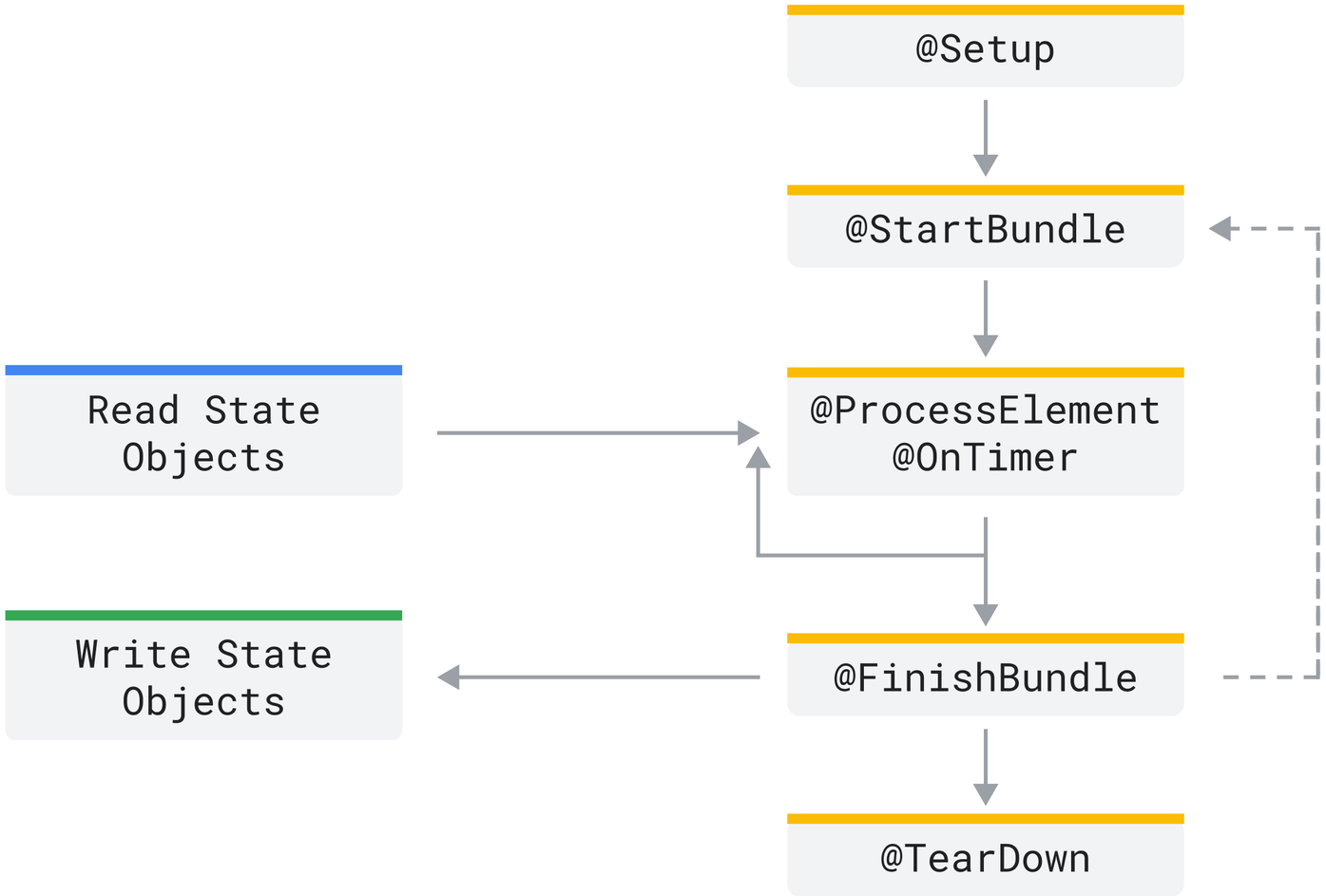


Dependent on the runner, the DoFn object can be reused across bundles

If there is an exception at any stage @TearDown is called.

The lifecycle of a DoFn



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