

# Use Cases

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We perform a series of tests with different production chains in order to verify that the algorithm works as planned.

The result of a query on a batchId should output 3 elements: the data from the batchId (chainMemberData), the places where that batchId came from (origin) and the places where the batchId went to (destination).

Once a batch is passed to another member of the chain, the batch can be kept as it is, aggregated with more batches or separated into multiple sub batches. In all these cases the batch will receive a new ID.

## Use Case #1

In a production chain, a batch can be passed from one member to another, without aggregation or division.

### Data

```
{ "id": "0x01", "batchId": "B1", "origin": [], "destination": [ "0x02" ],  
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b8233011973e"}  
  
{ "id": "0x02", "batchId": "B2", "origin": [ "B1" ], "destination": [ "0x03" ],  
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b8233011973f"}  
  
{ "id": "0x03", "batchId": "B3", "origin": [ "B2" ], "destination": [],  
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119740"}
```

### Query Result for batchId: B2

```
{  
  "origin": [  
    {  
      "_id": "6385eb517553b8233011973e",  
      "id": "0x01",  
      "batchId": "B1",  
      "origin": [],  
      "destination": [ "0x02" ],  
      "data": {  
        "numberChickens": 100  
      }  
    }  
  ],  
  "chainMemberData": {  
    "_id": "6385eb517553b8233011973f",  
    "id": "0x02",  
    "batchId": "B2",  
    "origin": [ "B1" ],  
    "destination": [ "0x03" ],  
    "data": {  
      "numberChickens": 100  
    }  
  }  
}
```

```

    "batchId": "B2",
    "origin": [
      "B1"
    ],
    "destination": [
      "0x03"
    ],
    "data": {
      "numberChickens": 100
    }
  },
  "destinations": [
    {
      "_id": "6385eb517553b82330119740",
      "id": "0x03",
      "batchId": "B3",
      "origin": [
        "B2"
      ],
      "destination": [],
      "data": {
        "numberChickens": 100
      }
    }
  ]
}

```

## Use Case #2

In a production chain, two batches can be aggregated into one batch.

### Data

```

{ "id": "0x01", "batchId": "B1", "origin": [], "destination": [ "0x03" ],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119741"}

{ "id": "0x02", "batchId": "B2", "origin": [], "destination": [ "0x03" ],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119742"}

{ "id": "0x03", "batchId": "B3", "origin": [ "B1", "B2" ],
  "destination": [], "data": { "numberChickens": 100 }, "_id":
  "6385eb517553b82330119743"}

```

### Query Result for batchId: B3

```

{
  "origin": [
    {
      "_id": "6385eb517553b82330119741",

```

```

        "id": "0x01",
        "batchId": "B1",
        "origin": [],
        "destination": [
            "0x03"
        ],
        "data": {
            "numberChickens": 100
        }
    },
    {
        "_id": "6385eb517553b82330119742",
        "id": "0x02",
        "batchId": "B2",
        "origin": [],
        "destination": [
            "0x03"
        ],
        "data": {
            "numberChickens": 100
        }
    }
],
"chainMemberData": {
    "_id": "6385eb517553b82330119743",
    "id": "0x03",
    "batchId": "B3",
    "origin": [
        "B1",
        "B2"
    ],
    "destination": [],
    "data": {
        "numberChickens": 100
    }
},
"destinations": []
}

```

## Use Case #3

In a production chain, one batch can be separated into two batches.

### Data

```

{ "id": "0x01", "batchId": "B1", "origin": [], "destination": [ "0x02",
"0x03" ], "data": { "numberChickens": 100 }, "_id":
"6385eb517553b82330119744"}

{ "id": "0x02", "batchId": "B2", "origin": [ "B1" ], "destination": [],
"data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119745"}

```

```
{ "id": "0x03", "batchId": "B3", "origin": [ "B1" ], "destination": [],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119746"}
```

### Query Result for batchId: B1

```
{
  "origin": [],
  "chainMemberData": {
    "_id": "6385eb517553b82330119744",
    "id": "0x01",
    "batchId": "B1",
    "origin": [],
    "destination": [
      "0x02",
      "0x03"
    ],
    "data": {
      "numberChickens": 100
    }
  },
  "destinations": [
    {
      "_id": "6385eb517553b82330119745",
      "id": "0x02",
      "batchId": "B2",
      "origin": [
        "B1"
      ],
      "destination": [],
      "data": {
        "numberChickens": 100
      }
    },
    {
      "_id": "6385eb517553b82330119746",
      "id": "0x03",
      "batchId": "B3",
      "origin": [
        "B1"
      ],
      "destination": [],
      "data": {
        "numberChickens": 100
      }
    }
  ]
}
```

### Use Case #4

In a production chain, a child batch can have the same destination as his parent batch. Here batch B3 is an aggregation of B2 and B1, but B2 also comes from B1. In this case we need to make sure that B3 is not duplicated in the destinations if we query on B1.

## Data

```
{ "id": "0x01", "batchId": "B1", "origin": [], "destination": [ "0x02",
"0x03" ], "data": { "numberChickens": 100 }, "_id":
"6385eb517553b82330119747"}

{ "id": "0x02", "batchId": "B2", "origin": [ "B1" ], "destination": [
"0x03" ], "data": { "numberChickens": 100 }, "_id":
"6385eb517553b82330119748"}

{ "id": "0x03", "batchId": "B3", "origin": [ "B1", "B2" ],
"destination": [], "data": { "numberChickens": 100 }, "_id":
"6385eb517553b82330119749"}
```

## Query Result for batchId: B1

```
{
  "origin": [],
  "chainMemberData": {
    "_id": "6385eb517553b82330119747",
    "id": "0x01",
    "batchId": "B1",
    "origin": [],
    "destination": [
      "0x02",
      "0x03"
    ],
    "data": {
      "numberChickens": 100
    }
  },
  "destinations": [
    {
      "_id": "6385eb517553b82330119748",
      "id": "0x02",
      "batchId": "B2",
      "origin": [
        "B1"
      ],
      "destination": [
        "0x03"
      ],
      "data": {
        "numberChickens": 100
      }
    }
  ],
}
```

```

    {
      "_id": "6385eb517553b82330119749",
      "id": "0x03",
      "batchId": "B3",
      "origin": [
        "B1",
        "B2"
      ],
      "destination": [],
      "data": {
        "numberChickens": 100
      }
    }
  ]
}

```

## Use Case #5

In a production chain, all the above cases can appear.

### Data

```

{ "id": "0x01", "batchId": "B1", "origin": [], "destination": [ "0x03" ],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b8233011974a"}

{ "id": "0x02", "batchId": "B2", "origin": [], "destination": [ "0x03" ],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b8233011974b"}

{ "id": "0x03", "batchId": "B3", "origin": [ "B1", "B2" ],
  "destination": [ "0x05" ], "data": { "numberChickens": 100 }, "_id":
  "6385eb517553b8233011974c"}

{ "id": "0x04", "batchId": "B4", "origin": [], "destination": [ "0x05" ],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b8233011974d"}

{ "id": "0x05", "batchId": "B5", "origin": [ "B3", "B4" ],
  "destination": [ "0x06", "0x07" ], "data": { "numberChickens": 100 },
  "_id": "6385eb517553b8233011974e"}

{ "id": "0x06", "batchId": "B6", "origin": [ "B5" ], "destination": [
  "0x08" ], "data": { "numberChickens": 100 }, "_id":
  "6385eb517553b8233011974f"}

{ "id": "0x07", "batchId": "B7", "origin": [ "B5" ], "destination": [
  "0x08", "0x09", "0x10" ], "data": { "numberChickens": 100 }, "_id":
  "6385eb517553b82330119750"}

{ "id": "0x08", "batchId": "B8", "origin": [ "B6", "B7" ],
  "destination": [], "data": { "numberChickens": 100 }, "_id":
  "6385eb517553b82330119751"}

```

```
{ "id": "0x09", "batchId": "B9", "origin": [ "B7" ], "destination": [],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119752"}

{ "id": "0x10", "batchId": "B10", "origin": [ "B7" ], "destination": [],
  "data": { "numberChickens": 100 }, "_id": "6385eb517553b82330119753"}
```

### Query Result for batchId: B5

```
{
  "origin": [
    {
      "_id": "6385eb517553b8233011974c",
      "id": "0x03",
      "batchId": "B3",
      "origin": [
        "B1",
        "B2"
      ],
      "destination": [
        "0x05"
      ],
      "data": {
        "numberChickens": 100
      }
    },
    {
      "_id": "6385eb517553b8233011974d",
      "id": "0x04",
      "batchId": "B4",
      "origin": [],
      "destination": [
        "0x05"
      ],
      "data": {
        "numberChickens": 100
      }
    },
    {
      "_id": "6385eb517553b8233011974a",
      "id": "0x01",
      "batchId": "B1",
      "origin": [],
      "destination": [
        "0x03"
      ],
      "data": {
        "numberChickens": 100
      }
    },
    {
      "_id": "6385eb517553b8233011974b",
```

```
        "id": "0x02",
        "batchId": "B2",
        "origin": [],
        "destination": [
            "0x03"
        ],
        "data": {
            "numberChickens": 100
        }
    },
    "chainMemberData": {
        "_id": "6385eb517553b8233011974e",
        "id": "0x05",
        "batchId": "B5",
        "origin": [
            "B3",
            "B4"
        ],
        "destination": [
            "0x06",
            "0x07"
        ],
        "data": {
            "numberChickens": 100
        }
    },
    "destinations": [
        {
            "_id": "6385eb517553b8233011974f",
            "id": "0x06",
            "batchId": "B6",
            "origin": [
                "B5"
            ],
            "destination": [
                "0x08"
            ],
            "data": {
                "numberChickens": 100
            }
        },
        {
            "_id": "6385eb517553b82330119750",
            "id": "0x07",
            "batchId": "B7",
            "origin": [
                "B5"
            ],
            "destination": [
                "0x08",
                "0x09",
                "0x10"
            ],
        },
    ],
}
```



```
    "data": {
      "numberChickens": 100
    }
  },
  {
    "_id": "6385eb517553b82330119751",
    "id": "0x08",
    "batchId": "B8",
    "origin": [
      "B6",
      "B7"
    ],
    "destination": [],
    "data": {
      "numberChickens": 100
    }
  },
  {
    "_id": "6385eb517553b82330119752",
    "id": "0x09",
    "batchId": "B9",
    "origin": [
      "B7"
    ],
    "destination": [],
    "data": {
      "numberChickens": 100
    }
  },
  {
    "_id": "6385eb517553b82330119753",
    "id": "0x10",
    "batchId": "B10",
    "origin": [
      "B7"
    ],
    "destination": [],
    "data": {
      "numberChickens": 100
    }
  }
]
}
```