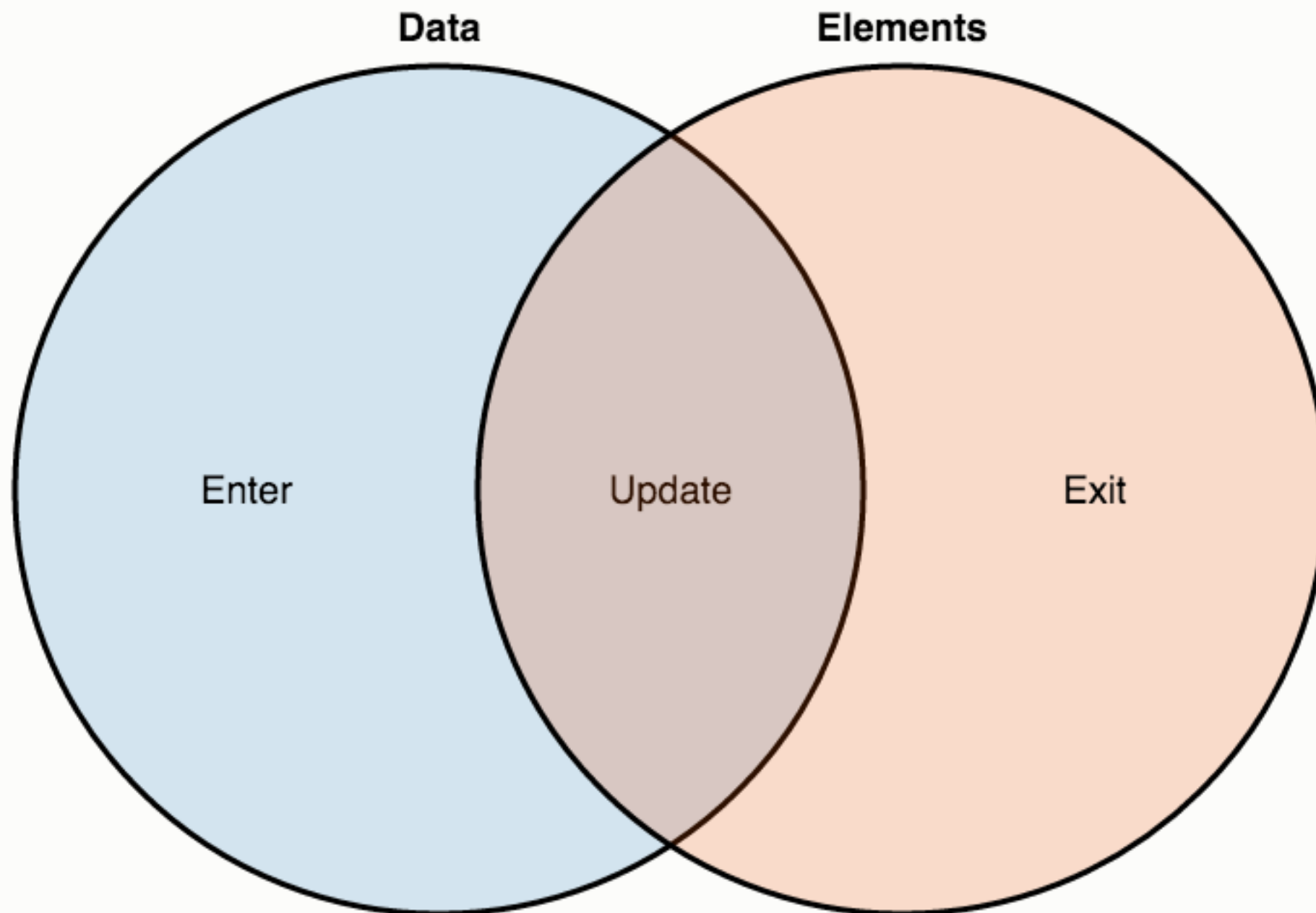# D3 General Update Pattern

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"the data join"

Enter

The Data Join

Data

DOM

svg

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```

```
var boxes = svg.selectAll('rect')
  .data(data)
  .enter().append('rect')
  .attr('width', 50)
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```

The Data Join

Data

DOM

svg

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```
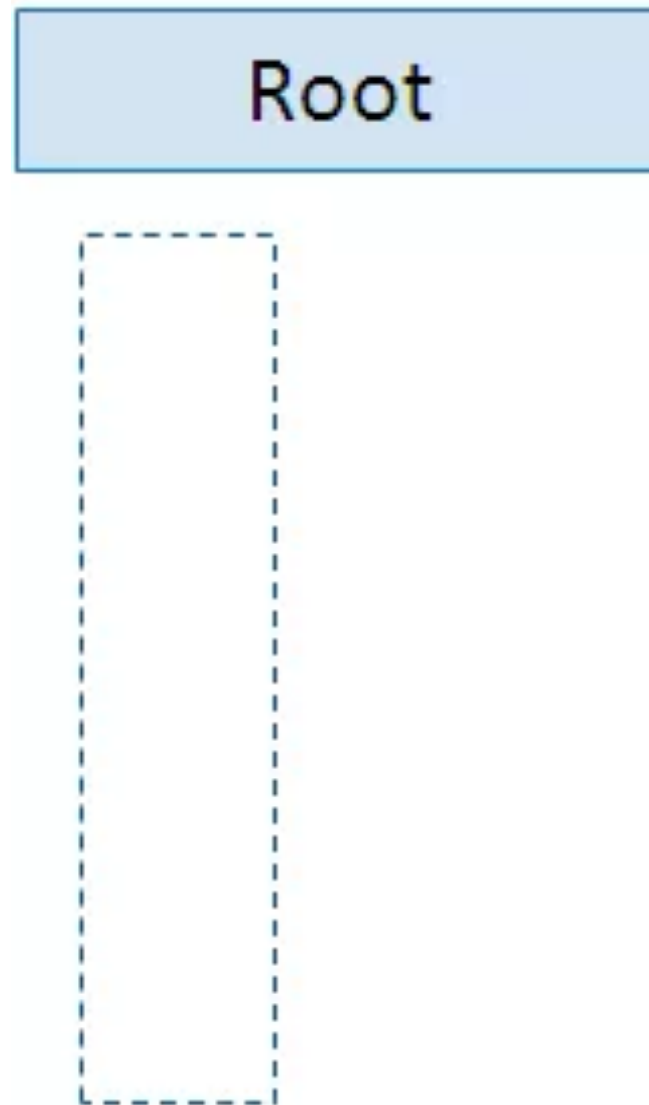
```
var boxes = svg.selectAll('rect')
  .data(data)
  .enter().append('rect')
  .attr('width', 50)
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```
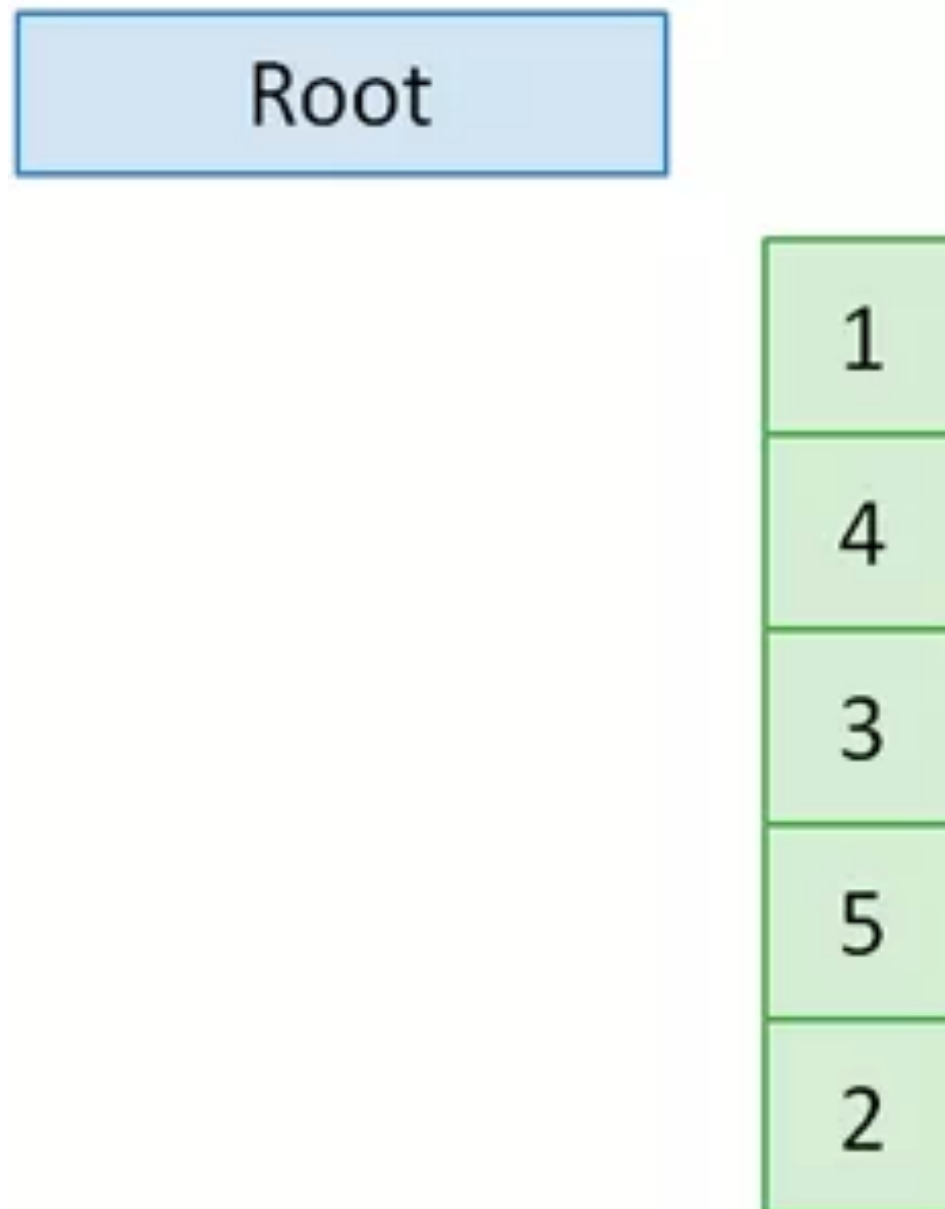
.selectAll()

Root

.data()

Root

1
4
3
5
2

credit to Jerome Cukier
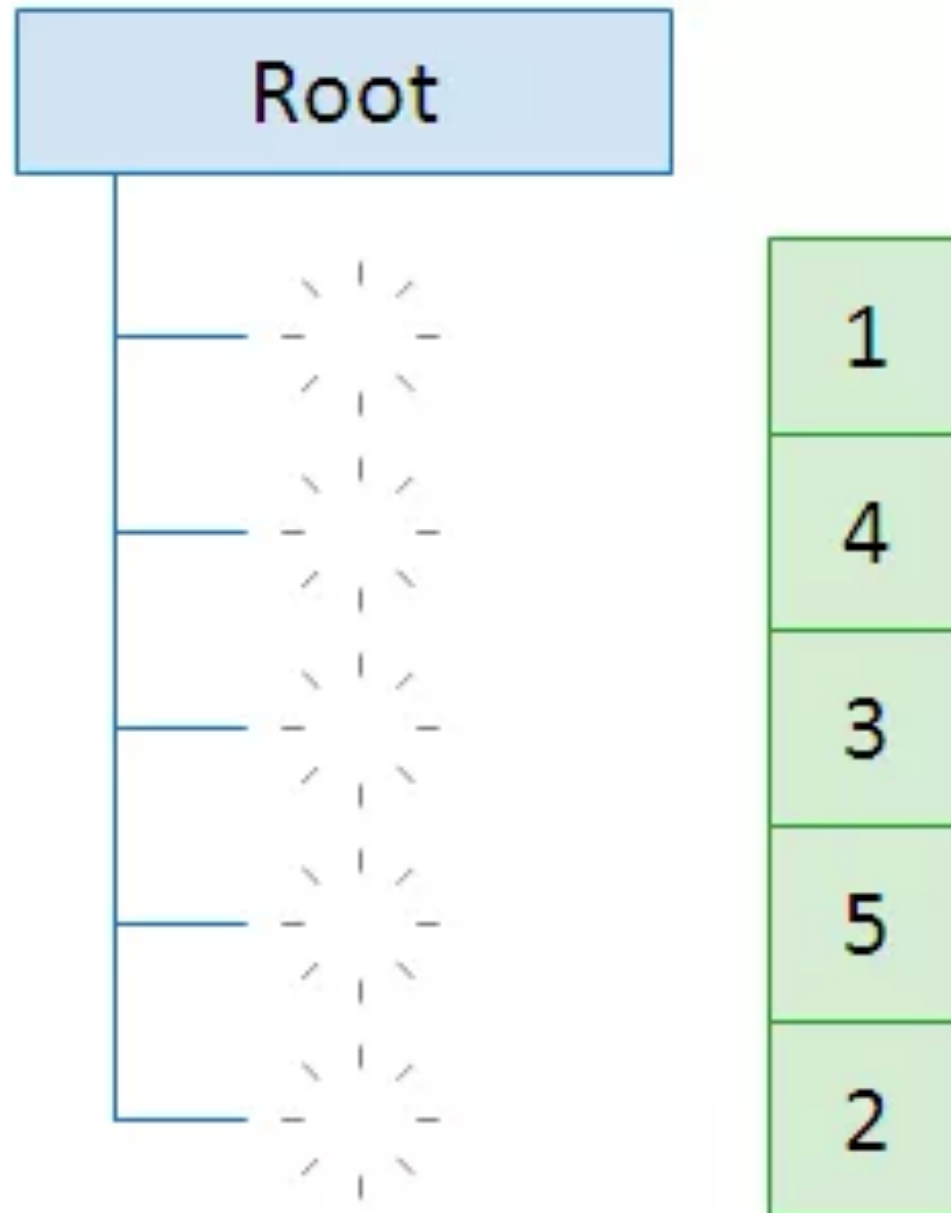
.enter()

credit to Jerome Cukier

.append()
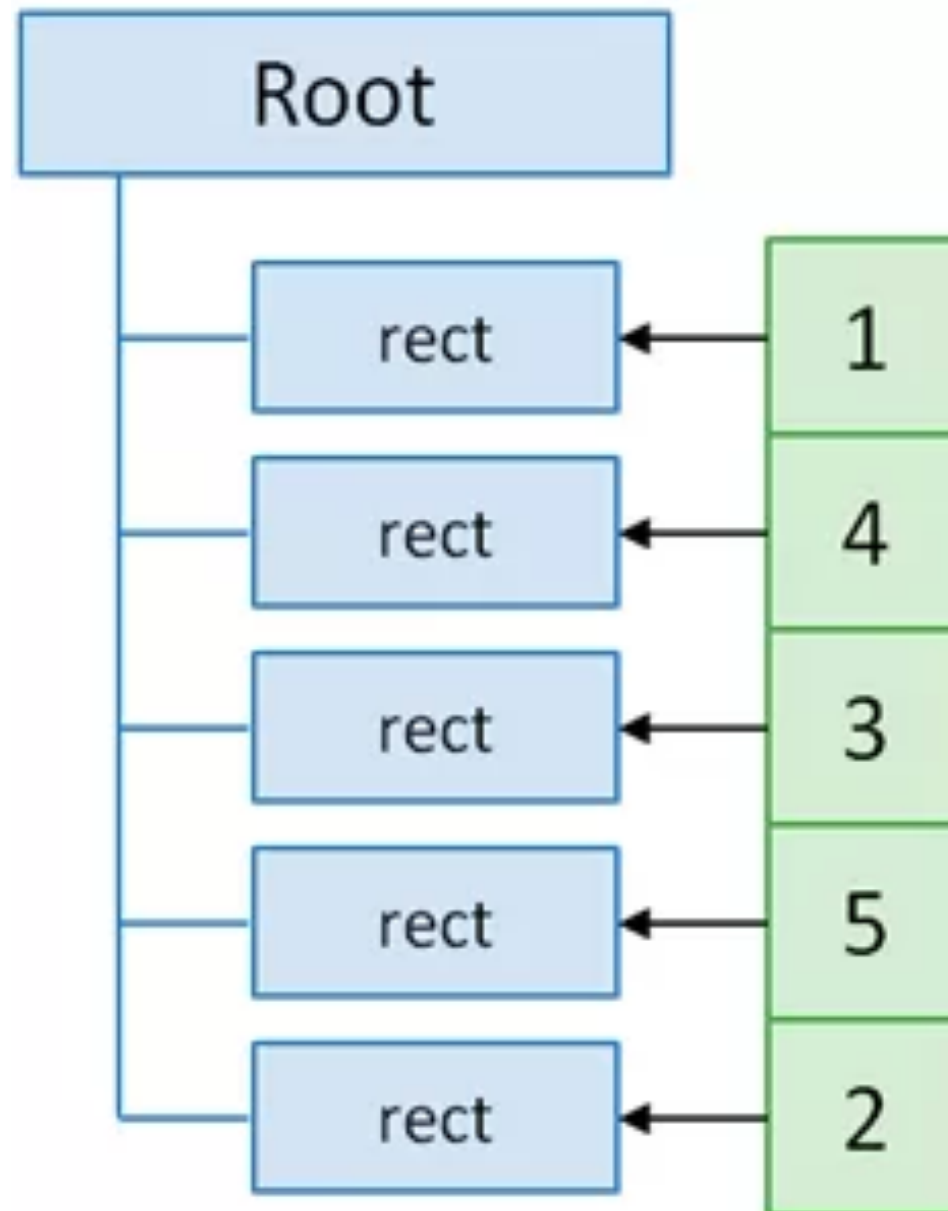
credit to Jerome Cukier

Enter

Data

DOM

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```

svg

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data)
  .enter()
  .append('rect')
  .attr('width', function(d) { return d.value })
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```

Enter

Data

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```

DOM

svg

id: 1

id: 2

id: 3

id: 4

id: 5

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data) //bind data to selection of rects (selection is currently empty; placeholders created)
  .enter()
  .append('rect')
  .attr('width', function(d) { return d.value })
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```

Enter

Data

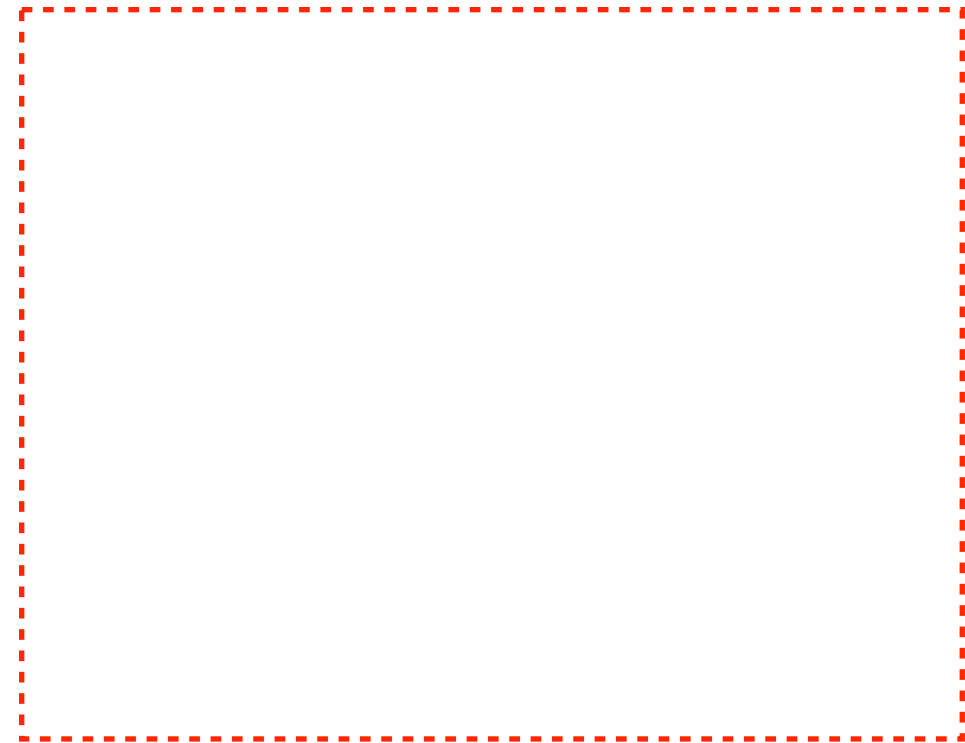## DOM

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```

svg

id: 1

id: 2

id: 3

id: 4

id: 5

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data) //bind data to selection of rects (selection is currently empty; placeholders created)
  .enter() //determines which data is not yet represented in the DOM
  .append('rect')
  .attr('width', function(d) { return d.value })
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```

Enter

Data

DOM

```
var data = [
  {id: 1, value: 5},
  {id: 2, value: 10},
  {id: 3, value: 15},
  {id: 4, value: 20},
  {id: 5, value: 25}
];
```

svg

id: 1 width: 5

id: 2 width: 10

id: 3 width: 15

id: 4 width: 20

id: 5 width: 25

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data) //bind data to selection of rects (selection is currently empty; placeholders created)
  .enter() //determines which data is not yet represented in the DOM
  .append('rect') //appends a rect for each entering element
  .attr('width', function(d) { return d.value }) //define necessary attributes
  .attr('height', 20)
  .attr('x', 0)
  .attr('y, function(d, i) { return i * 30 })
```

Enter returns elements in the data *not* in the DOM

What if there are already rectangles in the DOM?

Update

Update

Data

DOM

```
var data = [
  {id: 1, value: 1},
  {id: 2, value: 2},
  {id: 3, value: 3},
  {id: 4, value: 4},
  {id: 5, value: 5}
];
```

svg

id: 1 width: 5

id: 2 width: 10

id: 3 width: 15

id: 4 width: 20

id: 5 width: 25

```
var boxes = svg.selectAll('rect')
  .data(data)
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Update

Data

DOM

```
var data = [
  {id: 1, value: 1},
  {id: 2, value: 2},
  {id: 3, value: 3},
  {id: 4, value: 4},
  {id: 5, value: 5}
];
```

id: 1 width: 5

id: 2 width: 10

id: 3 width: 15

id: 4 width: 20

id: 5 width: 25

svg

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data)
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Update

Data

DOM

```
var data = [
  {id: 1, value: 1},
  {id: 2, value: 2},
  {id: 3, value: 3},
  {id: 4, value: 4},
  {id: 5, value: 5}
];
```

id: 1 width: 5

id: 2 width: 10

id: 3 width: 15

id: 4 width: 20

id: 5 width: 25

svg

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Update

Data

DOM

```
var data = [
  {id: 1, value: 1},
  {id: 2, value: 2},
  {id: 3, value: 3},
  {id: 4, value: 4},
  {id: 5, value: 5}
];
```

svg

id: 1 width: 1

id: 2 width: 2

id: 3 width: 3

id: 4 width: 4

id: 5 width: 5

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Data returns elements in the data *and* on the DOM

Exit

Exit

Data

DOM

```
var data = [
  {id: 1, value: 10},
  {id: 2, value: 20}
];
```

id: 1 width: 1

id: 2 width: 2

id: 3 width: 3

id: 4 width: 4

id: 5 width: 5

svg

```
var boxes = svg.selectAll('rect') //select all rects in svg
  .data(data)
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Exit

Data

DOM

svg

```
var data = [
  {id: 1, value: 10},
  {id: 2, value: 20}
];
```

id: 1 width: 1

id: 2 width: 2

id: 3 width: 3

id: 4 width: 4

id: 5 width: 5

```
var boxes = svg.selectAll('rect')
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Exit

Data

DOM

```
var data = [
  {id: 1, value: 10},
  {id: 2, value: 20}
];
```

id: 1 width: 10

id: 2 width: 20

id: 3 width: 3

id: 4 width: 4

id: 5 width: 5

svg

```
var boxes = svg.selectAll('rect')
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
```

Exit

Data

DOM

```
var data = [
  {id: 1, value: 10},
  {id: 2, value: 20}
];
```

id: 1 width: 10

id: 2 width: 20

id: 3 width: 3
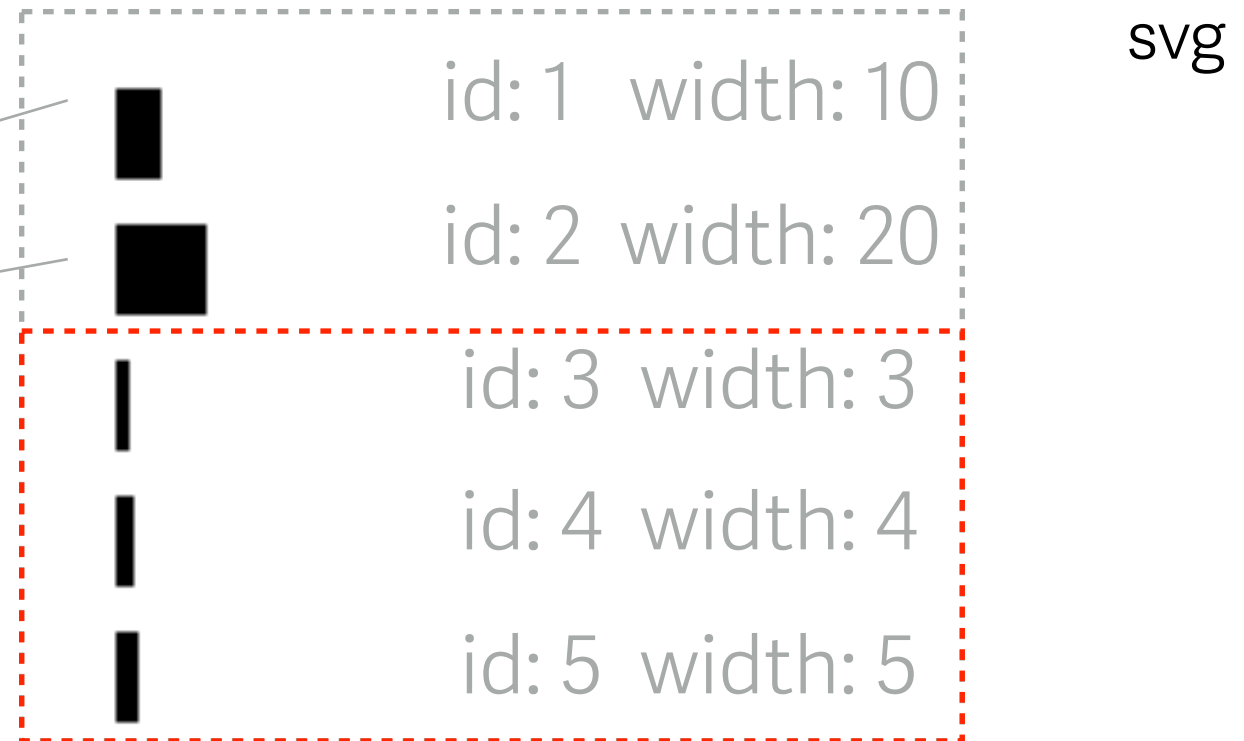
id: 4 width: 4

id: 5 width: 5

svg

```
var boxes = svg.selectAll('rect')
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data

boxes.exit() //returns elements in DOM no longer in the data
  .remove()
```

Exit

Data

DOM

```
var data = [
  {id: 1, value: 10},
  {id: 2, value: 20}
];
```

id: 1 width: 10

id: 2 width: 20

svg

```
var boxes = svg.selectAll('rect')
  .data(data) //binds data to selection of rects. Return elements that match. No placeholder elements
  .attr('width', function(d) { return d.value }) //sets width value in DOM using new data

boxes.exit() //returns elements in DOM no longer in the data
  .remove() //removes elements from the screen
```

Exit returns elements in the DOM *not* in the data

Update and enter

Update and Enter

Data

DOM

```
var data = [
  {id: 1, value: 20},
  {id: 2, value: 20},
  {id: 3, value: 30},
  {id: 4, value: 40}
];
```

svg

id: 1 width: 10

id: 2 width: 20

```
var boxes = svg.selectAll('rext').data(data)

var boxes = boxes
    .enter().append('rect')
    .merge(boxes)
    .attr('width', function(d) { return d.value })
    .attr('height', 20)
    .attr('x', 0)
    .attr('y', function(d, i) { return i * 30})
```

Update and Enter

Data

DOM

svg

```
var data = [
  {id: 1, value: 20},
  {id: 2, value: 20},
  {id: 3, value: 30},
  {id: 4, value: 40}
];
```

id: 1 width: 10

id: 2 width: 20

```
var boxes = svg.selectAll('rext').data(data) // binds data to selection of rects. Return elements
that match. No placeholder elements

var boxes = boxes
    .enter().append('rect')
    .merge(boxes)
    .attr('width', function(d) { return d.value })
    .attr('height', 20)
    .attr('x', 0)
    .attr('y', function(d, i) { return i * 30})
```

Update and Enter

Data

DOM

```
var data = [
  {id: 1, value: 20},
  {id: 2, value: 20},
  {id: 3, value: 30},
  {id: 4, value: 40}
];
```

svg

id: 1 width: 20

id: 2 width: 10

id: 3 width: 15

id: 4 width: 20

```
var boxes = svg.selectAll('rext').data(data) // binds data to selection of rects. Return elements
that match. No placeholder elements

var boxes = boxes
    .enter().append('rect') // appends a rect for each entering element
    .merge(boxes) //Merge update applies changes to entering AND updating rects
    .attr('width', function(d) { return d.value }) //sets width value in DOM using new data
    .attr('height', 20)
    .attr('x', 0)
    .attr('y', function(d, i) { return i * 30})
```

Summary

- Enter returns elements in the data *not* in the DOM

- Exit returns elements on the DOM *not* in the data

- Data (update selection) returns elements in the data *and* on the DOM