Parsing OSM XML

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iD OSMCha To-Fix

Breaking down iD

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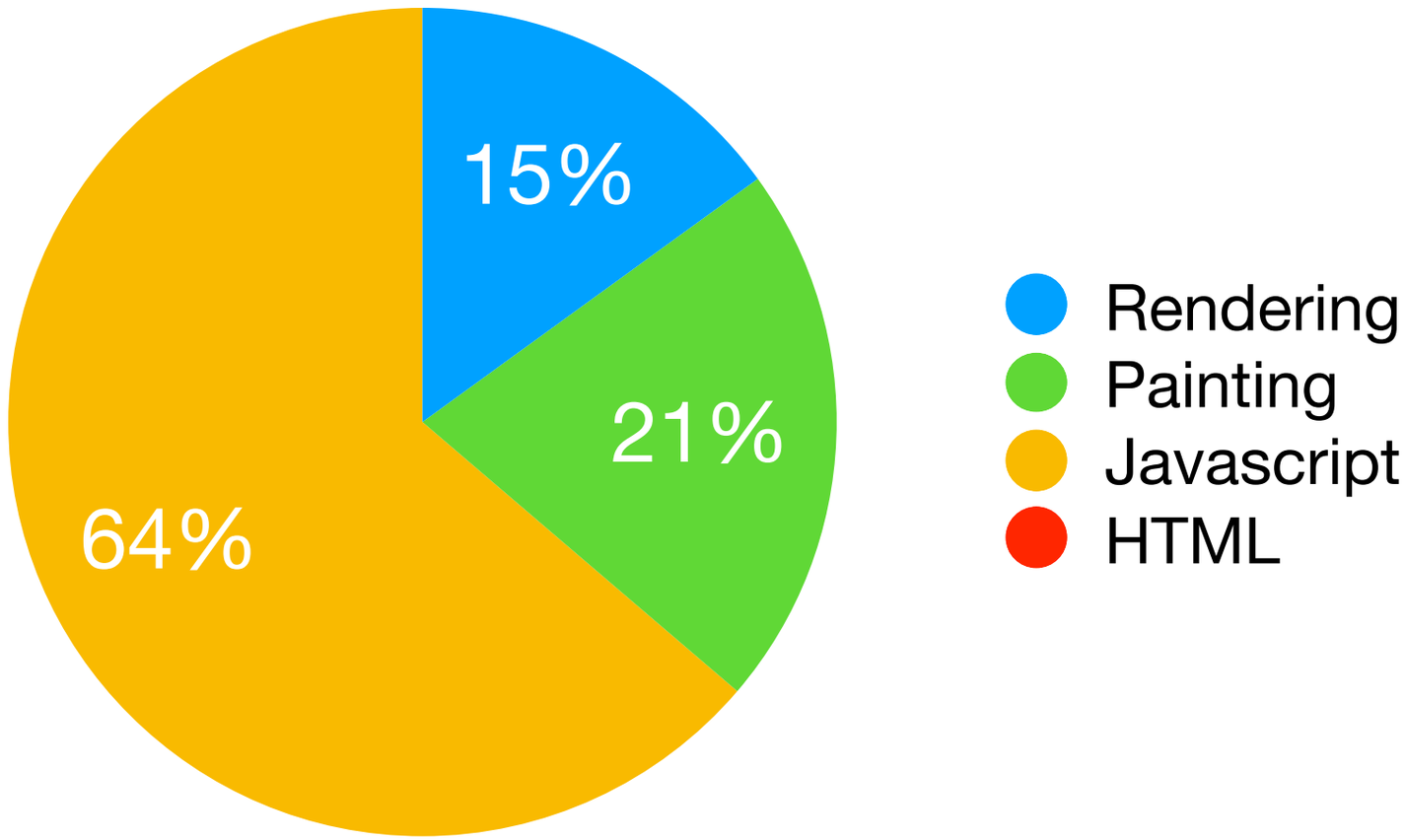
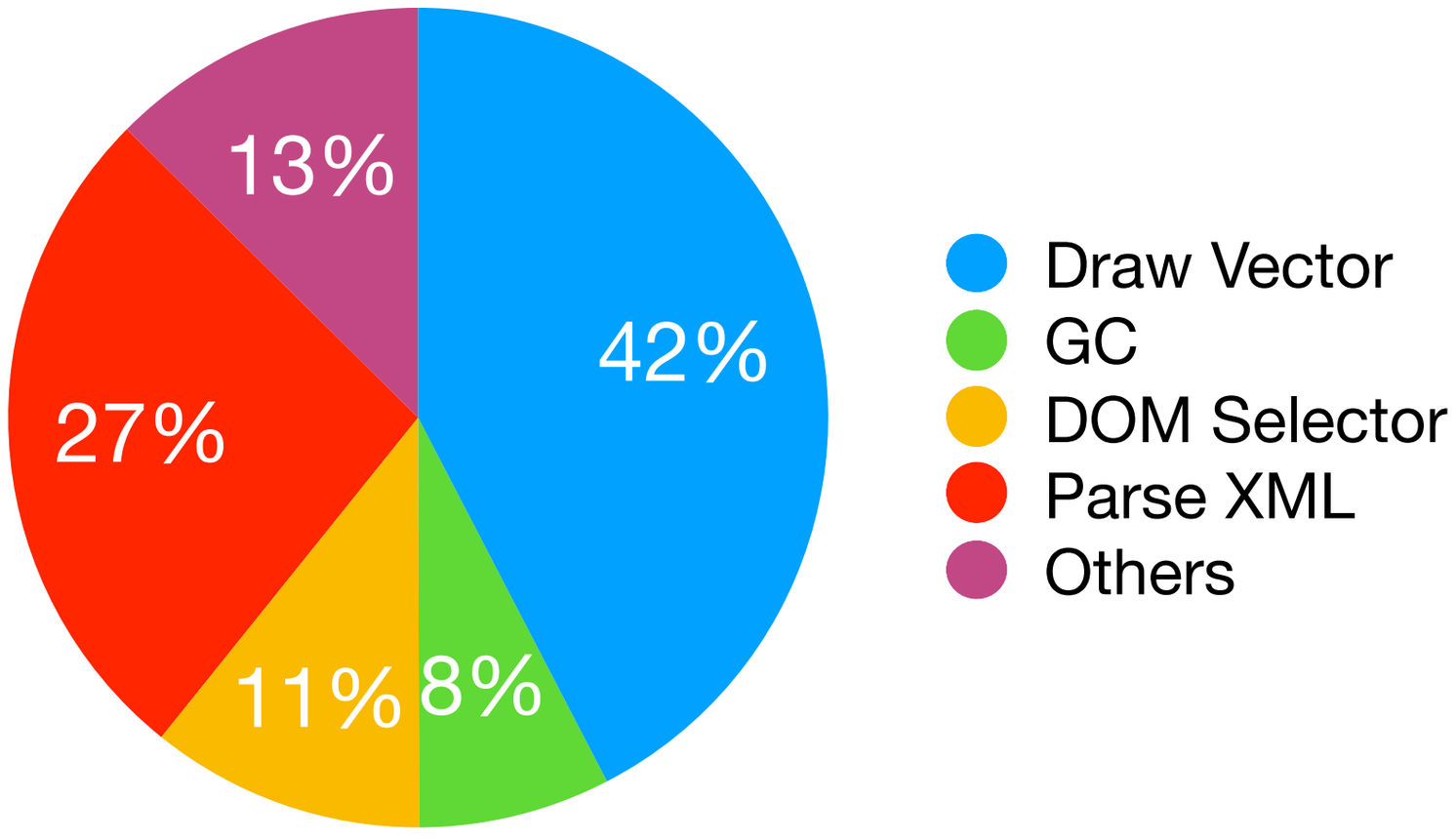


A sample of what iD is doing behind the scenes

Breaking down JS



Parsing XML eats up **25%** of CPU Time

Solutions?

- Stop parsing XML ?

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- Use clever techniques to **defer** the parsing of XML

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The Multi-threading Solution

- Even the cheapest smartphone has at least **two core** for processing

- Unlike UI, parsing can be easily offloaded to a **separate thread.**

- This will improve the **response time** and alleviate some of the pressure on main thread.

Browsers and Threads

- Browser threads a.k.a **web-workers** do not support DOM/XML

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- Browser threads a.k.a **web-workers** do not support DOM/XML
- iD wasn’t written to be executed in a multi-threaded environment

Osm-Bizli

- To circumvent the problem of not having DOM, I created a new library called **Osm-Bizli**.

- It relies on string parsing of XML line by line.

- It only understands the **particular XML** returned by the bbox API.

- With these focused features, it is able to deliver impressive performance.

Parsers	Time
osm-bizli	0s, 41.30629ms
osmium	0s, 50.834623ms
osm-bizli (node)	0s, 56.342906ms
iD xml-parser	0s, 126.757749ms
osmtogeojson	0s, 156.496379ms

How does it work?

- <way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>

We parse the XML line by line.

How does it work?

- <way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>

```
{
    attributes: {},
    type: 'way',
    nodes: [],
    tags: {},
}
```

For each **Entity** we create a corresponding blank object.

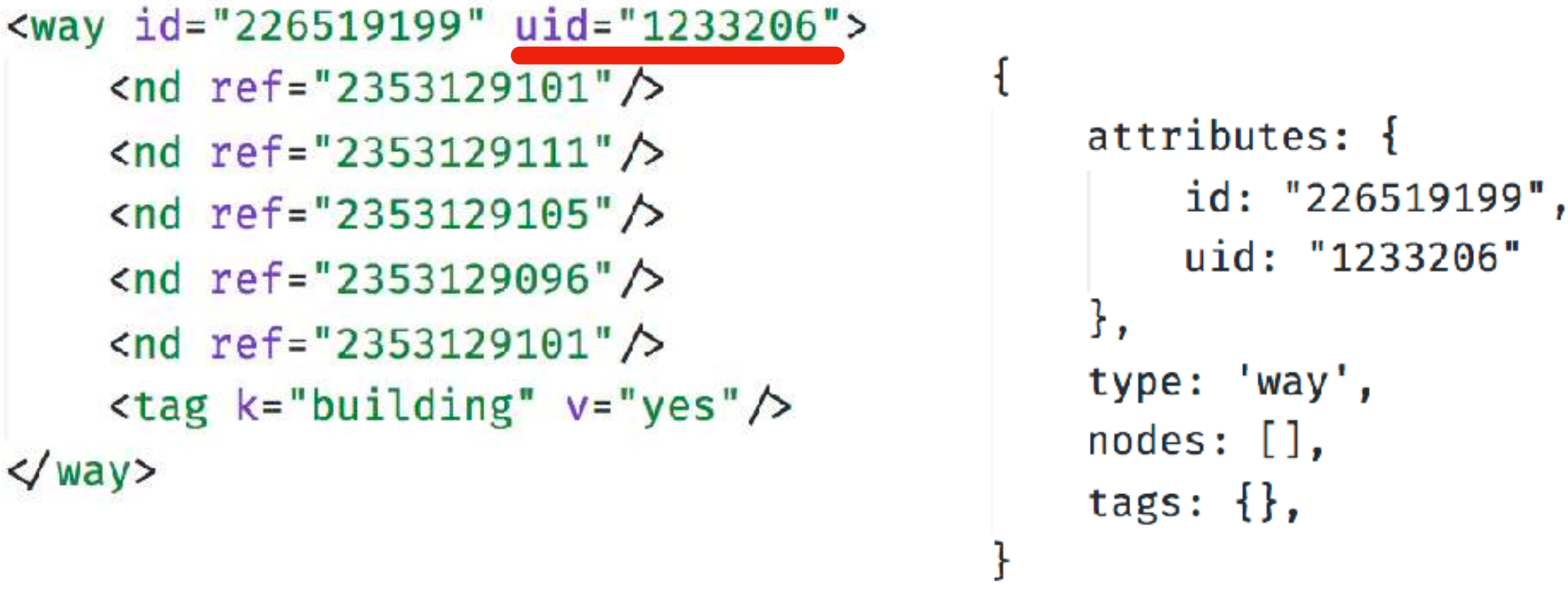
How does it work?

- <way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>

```
{
    attributes: {
        id: "226519199"
    },
    type: 'way',
    nodes: [],
    tags: {},
}
```

The attributes are populated.

How does it work?

- 

```
<way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>
```

```
{
    attributes: {
        id: "226519199",
        uid: "1233206"
    },
    type: 'way',
    nodes: [],
    tags: {},
}
```

How does it work?

```
<way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>
```

```
{
    attributes: {
        id: "226519199",
        uid: "1233206"
    },
    type: 'way',
    nodes: [],
    tags: {},
}
```

We then move to next line

How does it work?

```
<way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>
```

```
{
    attributes: {
        id: "226519199",
        uid: "1233206"
    },
    type: 'way',
    nodes: ["2353129101",
    tags: {
        building: "yes"
    },
}
```

If the line starts with **<nd** or **<tag**
we fill our **way** object with it

How does it work?

```
<way id="226519199" uid="1233206">
    <nd ref="2353129101" />
    <nd ref="2353129111" />
    <nd ref="2353129105" />
    <nd ref="2353129096" />
    <nd ref="2353129101" />
    <tag k="building" v="yes" />
</way>
```

```
{
    attributes: {
        id: "226519199",
        uid: "1233206"
    },
    type: 'way',
    nodes: ["2353129101",
    tags: {
        building: "yes"
    },
}
```

Whenever we encounter a closing tag, we save the object and start fresh with new line.

Takeaways

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- Multi-threading would **improve the performance** of iD
- **Osm-bizli** uses string parsing of OSM-xml to overcome the limitations of web-workers.
- Opens **future possibility** of offloading more tasks to web-worker.

Thanks