# COMP1531

#### Lecture 3.1

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## In This Lecture

### 🕨 Why? 🤔

 We need a common way of communicating between different operating systems, servers, and programming languages

## • What?

- Standard Interfaces
- JSON
- YAML
- XML





















# Standard Interfaces

What do all of these systems have in common?



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They are **standard interfaces**: A universal method of connecting different systems together



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For example, how would you share the results that a C program outputs with a Javascript program?...



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Use a data interchange format



To enable this standard interface for data, we have **data interchange formats**. These are basically extremely simple markup languages that are collections of arrays, objects, numbers, strings, booleans.

- Three main interchange formats we will talk about:
  - JSON
  - YAML
  - XML



JavaScript Object Notation (JSON) - TFC 7159

A format made up of braces for objects, square brackets for arrays, where all nonnumeric items must be wrapped in quotations. Very similar to javascript data structures.



Let's represent a structure that contains a list of locations, where each location has a suburb and postcode:

```
1 {
 2
     "locations": [
 3
        Ł
          "suburb" : "Kensington",
 4
          "postcode" : 2033
 5
 6
        },
 7
          "suburb" : "Mascot",
 8
          "postcode" : 2020
 9
10
        },
11
          "suburb" : "Sydney CBD",
12
          "postcode" : 2000
13
14
        }
15
16 }
```

It's very similar to normal Javascript, except:

- No trailing commas allowed
- Object keys must be strings and include apostrophes



Most languages have capabilities either built-in or via libraries to write and read json.

Most of the time these libraries are responsible for converting between Javascript-based data structure and a stringified / text-based dump of JSON.



```
1 import fs from 'fs';
 2
 3
   const DATA_STRUCTURE = {
     names: [
 4
 5
       {
 6
         first: 'Bob',
         last: 'Carr',
7
 8
       },
 9
       {
10
         first: 'Julia',
         last: 'Gillard',
11
12
       },
13
       {
14
      first: 'Ken',
         last: 'Henry',
15
16
       },
17
     ],
18 };
19
20 const data = JSON.stringify(DATA_STRUCTURE);
21 fs.writeFileSync('export.json', data, { flag: 'w' });
```



```
1 import fs from 'fs';
2
3 const json = fs.readFileSync('export.json', { flag: 'r' });
4 const data = JSON.parse(json);
5 console.log(data);
```

3.1\_unjson\_it.js



*YAML Ain't Markup Language* (YAML) is a popular modern interchange format due it's ease of editing and concise nature. It's easy to convert between JSON and YAML online.

- 1 ---
- 2 locations:
- 3 suburb: Kensington
- 4 postcode: 2033
- 5 suburb: Mascot
- 6 postcode: 2020
- 7 suburb: Sydney CBD
- 8 postcode: 2000
  - Unlike javascript, indentation matters
  - A dash is used to begin a list item
  - Very common for configuration(s)



eXtensible Markup Language (XML) is more of a legacy interchange format being used less and less

1	xml version="1.0" encoding="UTF-8"?
2	<root></root>
3	<locations></locations>
4	<element></element>
5	<postcode>2033</postcode>
6	<suburb>Kensington</suburb>
7	
8	<element></element>
9	<postcode>2020</postcode>
10	<suburb>Mascot</suburb>
11	
12	<element></element>
13	<postcode>2000</postcode>
14	<suburb>Sydney CBD</suburb>
15	
16	
17	



Issues with XML include:

- More verbose (harder to read at a glance)
- More demanding to process/interpret
- More bytes required to store (due to open/closing tags)

While you will find very few modern applications choose to use XML as an interchange format, many legacy systems will still use XML as a means of storing data





Or go to the form here.