Back-End Development

Exploring

#2 Built-In Modules

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Modules

Module is anything that can be loaded with ***require()*** in an NodeJS program, including:

- A folder with a ***package.json*** file containing a main field,
- A folder with an ***index.js*** file in it, or
- Just a JavaScript file.

NodeJS Built-In Modules

NodeJS has a set of built-in modules which you can use easily without any further installation.

- assert
- buffer
- cluster
- crypto
- dgram
- dns
- events
- fs
- http
- https
- net
- os
- path
- querystring
- readline
- stream
- string_decoder
- timers
- tls
- url
- util
- vm
- zlib

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Timers Module

```
var timers = require ('timers');

timers.setTimeout(function waktu() {
    console.log('Halo!');
}, 1000)

timers.setInterval(function waktu() {
    console.log('Ini loop!');
}, 2000)
```

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Assert Module
unit testing

```
const assert = require('assert');
var minum = {kopi:['luwak','hitam','susu']};

assert.equal(minum.kopi.length, 4);
// ==

assert.strictEqual(minum.kopi.length, 4);
// ===

assert.notEqual(minum.kopi.length, 3);
// !=

assert.notStrictEqual(minum.kopi.length, 3);
// !==
```

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Assert Module
unit val testing

```
const assert = require('assert');
var minum = {kopi:[12, 15, 20]};

assert.equal(minum.kopi[0], 'luwak');
// ==

assert.strictEqual(minum.kopi[1] * 2, 30);
// ===

assert.notEqual(minum.kopi[2], 20);
// !=

assert.notStrictEqual(minum.kopi.length, 3);
// !==
```

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Url Module

```
var url = require('url');
var link =
'http://lin.id/data.htm?tgl=2&bln=july';
var x = url.parse(link, true);

console.log('Host = '+x.host);
console.log('Path = '+x.pathname);
console.log('Find = '+x.search);

var xdata = x.query;

console.log(xdata);
console.log(xdata.tgl);
console.log(xdata.bln);
```

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OS Module

```
const os = require('os');

var namaCPU = os.hostname();
var osTipe = os.type();
var osPlatform = os.platform();
var osRilis = os.release();
var dirAwal = os.homedir();
var ramSisa = os.freemem();
var ramTotal = os.totalmem();
```

**Console.log semua var di atas!*

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OS Module

```
const os = require('os');
var dataUser = os.userInfo();
console.log(dataUser);
```

```
{ uid: -1,
  gid: -1,
  username: 'Windows 7',
  homedir: 'C:\\Users\\Windows 7',
  shell: null }
```

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OS Module

```
const os = require('os');
var dataUser = os.userInfo();

console.log(dataUser.uid);
console.log(dataUser.gid);
console.log(dataUser.username);
console.log(dataUser.homedir);
console.log(dataUser.shell);
```

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OS Module

```
const os = require('os');
var dataCPU = os.cpus();
console.log(dataCPU);
```

```
[ { model: 'AMD A6-4400M APU with Radeon(tm) HD Graphics',
    speed: 2695,
    times:
     { user: 2016749,
       nice: 0,
       sys: 1205154,
       idle: 15334835,
       irq: 109824 } },
  { model: 'AMD A6-4400M APU with Radeon(tm) HD Graphics',
    speed: 2695,
    times:
     { user: 2102066,
       nice: 0,
       sys: 1426878,
       idle: 15027014,
       irq: 412856 } } ]
```

OS Module

```
const os = require('os');
var dataCPU = os.cpus();

console.log(dataCPU[0].model);
console.log(dataCPU[1].speed);
console.log(dataCPU[1].times.user);
```

Events Module

```
// membuat event

var events = require('events');
var eventKu = new events.EventEmitter();

eventKu.on('klik', function(){
    console.log('Anda ngeklik!');
});

eventKu.on('drag', function(){
    console.log('Anda ngedrag!');
});
```

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Events Module

```
// mendata event

var events = require('events');
var eventKu = new events.EventEmitter();

eventKu.on('klik', function(){
    console.log('Anda ngeklik!'); });

eventKu.on('drag', function(){
    console.log('Anda ngedrag!'); });

console.log(eventKu._eventsCount)
console.log(eventKu.eventNames())
```

Events Module

```
// menjalankan event

var events = require('events');
var eventKu = new events.EventEmitter();

eventKu.on('klik', function(){
    console.log('Anda ngeklik!'); });

eventKu.on('drag', function(){
    console.log('Anda ngedrag!'); });

eventKu.emit('klik');
eventKu.emit('drag');
```

Events Module

```
// menjalankan event ber-parameter

var events = require('events');
var eventKu = new events.EventEmitter();

eventKu.on('klik', function(pesan){
    console.log('Anda ngeklik! '+pesan);
});

eventKu.on('drag', function(pesan){
    console.log('Anda ngedrag!'+pesan); });

eventKu.emit('klik', ' OK!');
eventKu.emit('drag', ' Sip!');
```

FS Module

```
const fs = require('fs');

fs.writeFile('halo.txt', ' Halo!');
// membuat file halo.txt yg konten awalnya ‘Halo!’

fs.appendFile('halo.txt', '\n Kuy! ');
// menambah konten halo.txt dg ‘\n Kuy!’
```

***Coba appendFile dahulu, kemudian writeFile!**
Lihat outputnya!

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FS Module

```
const fs = require('fs');

fs.writeFileSync('halo.txt','Halo!');
// writeFileSync = writeFile synchronously

fs.appendFileSync('halo.txt','\nYa!');
// appendFileSync = appendFile synchronously
```

***Coba appendFileSync dahulu, kemudian writeFileSync!**
Lihat outputnya!

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FS Module

```
const fs = require('fs');

var x =
fs.readFileSync('halo.txt');
console.log(x);

var y = fs.readFile('halo.txt',
    function(err, data){
        console.log(data)
});
```

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UTF-8 Text Encoding

FS Module

```
const fs = require('fs');

var x = fs.readFileSync('halo.txt',
'utf8');
console.log(x);

var y = fs.readFile('halo.txt',
'utf8',
    function(err, data){
        console.log(data)
});
```

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Convert to String

FS Module

```
const fs = require('fs');

var x =
fs.readFileSync('halo.txt');
console.log(x.toString());

var y = fs.readFile('halo.txt',
    function(err, data){
    console.log(data.toString())
});
```

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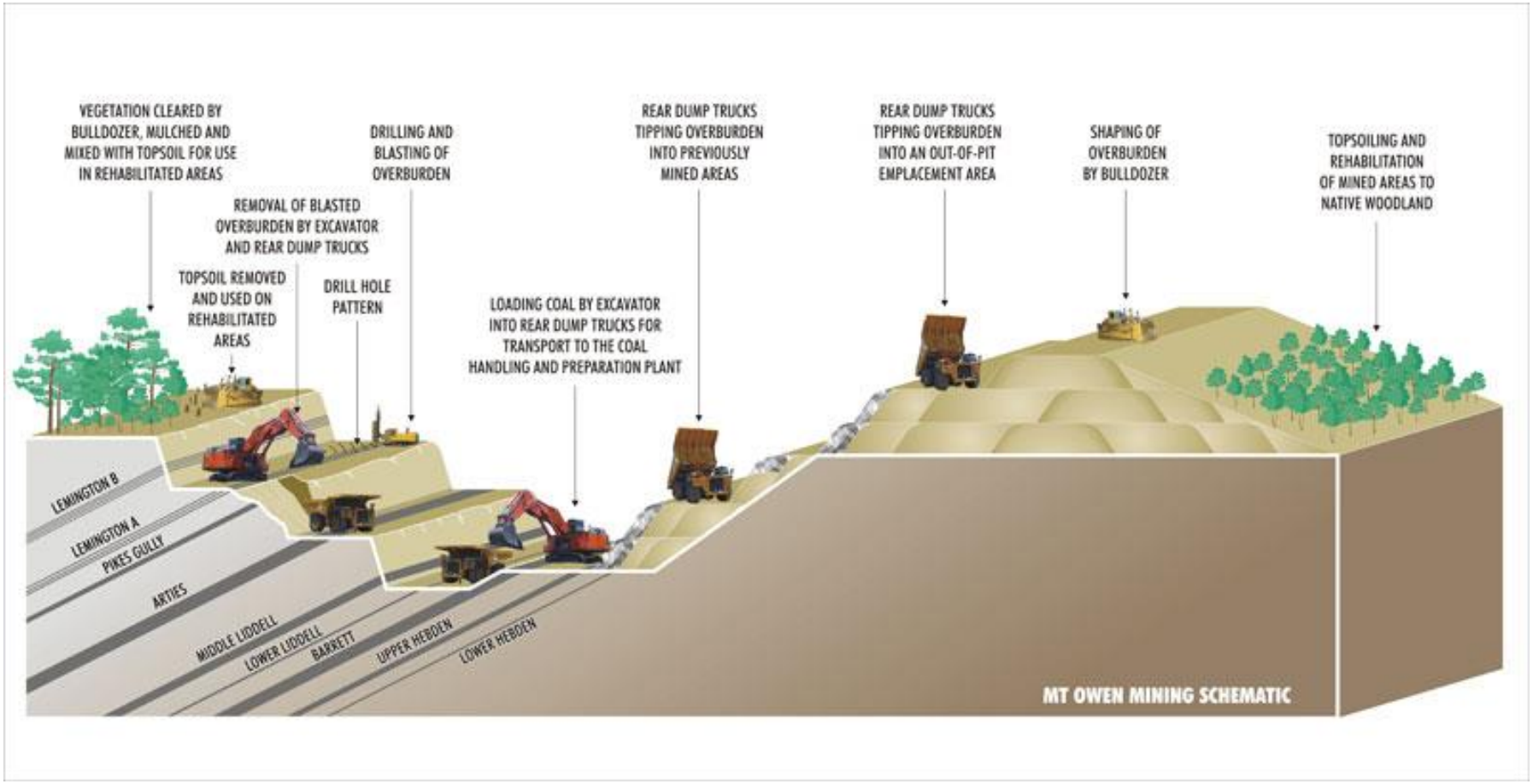
FS Module

```
const fs = require('fs');

fs.rename('halo.txt',
'sapa.txt');
// ubah nama file ‘halo.txt’ menjadi ‘sapa.txt’

fs.unlink('sapa.txt');
// menghapus file ‘sapa.txt’

fs.mkdir('okay');
// membuat direktori/folder ‘okay’

fs.rmdir('okay');
// menghapus direktori/folder ‘okay’
// folder yang akan dihapus harus kosong!
```

Buffer & Stream



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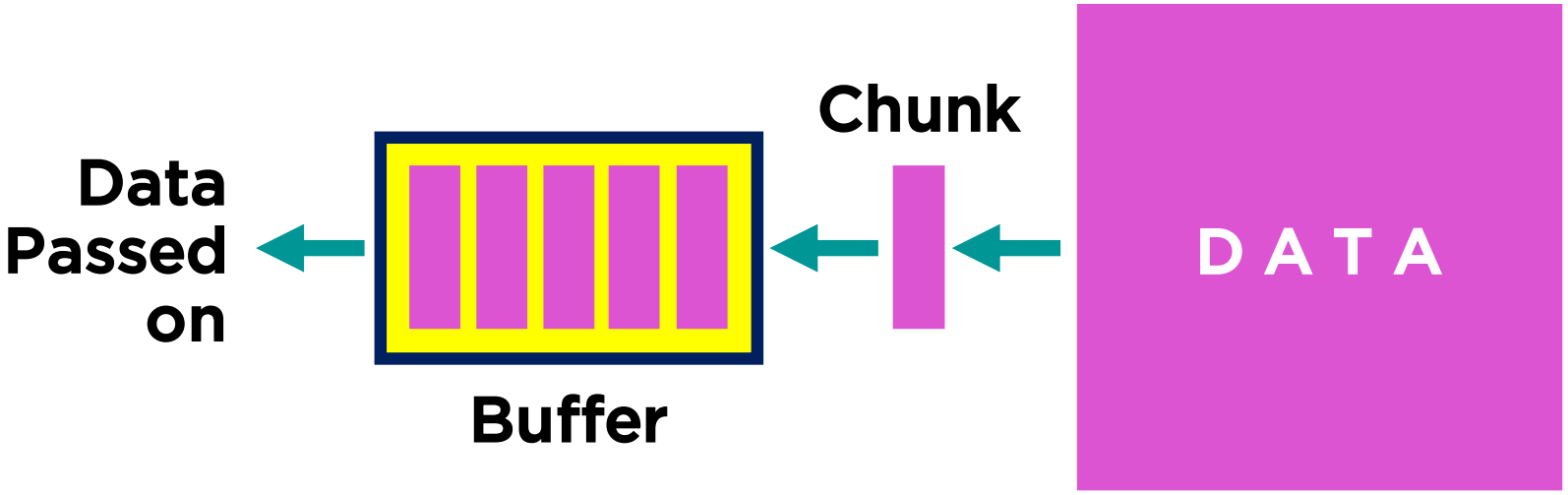
Buffer

- Buffer is temporary storage spot for a chunk of data that is being transferred from one place to another. Transfer small chunks of data at a time.



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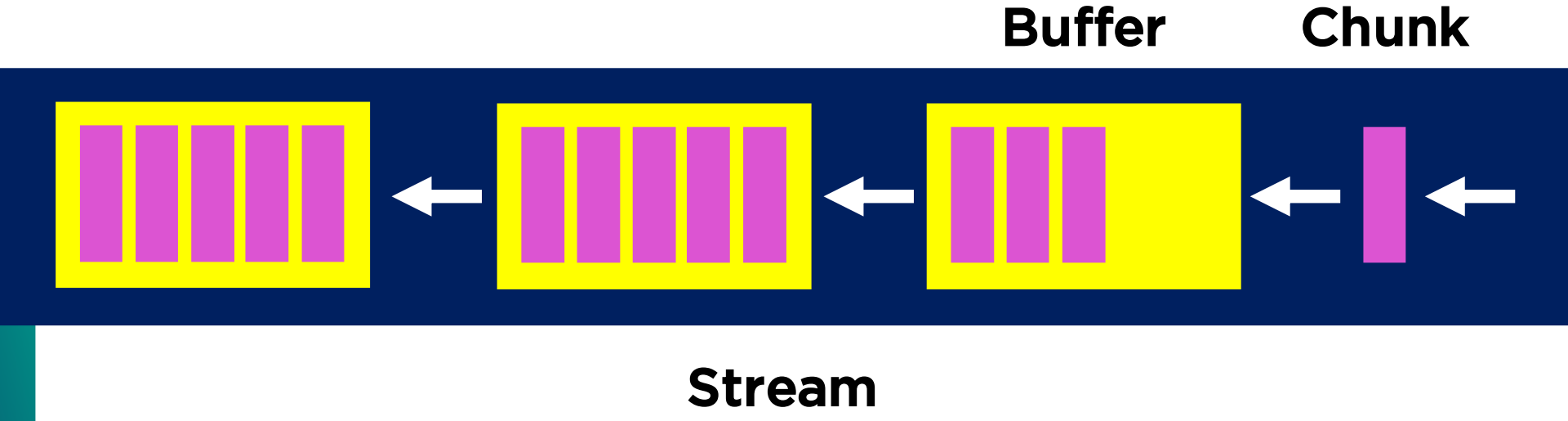
Stream

- Stream of data that flows over time from one place to another. Stream can increase our data transfer performance in Node.js.



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*Buat halo.txt berisi 2000 baris @60 char!

FS Read Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt');

bacaStream.on('data', function(potData){
    console.log('*** Potongan data masuk: ***');
    console.log(potData);
})
```

```
*** Potongan data sudah masuk: ***
<Buffer 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 6
1 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 61 ... >
*** Potongan data sudah masuk: ***
<Buffer 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 7
3 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 73 0d 0a 73 73 73 ... >
```

*Buat halo.txt berisi 2000 baris @60 char!

FS Read Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt',
'utf8');

bacaStream.on('data', function(potData){
    console.log('*** Potongan data masuk: ***');
    console.log(potData);
})
```

```
.....
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
*** Potongan data sudah masuk: ***
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
.....
```

*Buat halo.txt berisi 2000 baris @60 char!

FS Read Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt');

bacaStream.on('data', function(potData){
    console.log('*** Potongan data masuk: ***');
    console.log(potData.toString());
})
```

```
.....
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
*** Potongan data sudah masuk: ***
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
.....
```

* Byte terbaca, pause & resume

FS Read Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt');

bacaStream.on('data', function(potData){
    console.log('*** Potongan data masuk: ***');
    console.log(potData);

    console.log(bacaStream.bytesRead);
    bacaStream.pause();
    setTimeout(function(){
            bacaStream.resume();
    },5000)
})
```

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FS Read & Write Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt','utf8');

var tulisStream =
fs.createWriteStream(__dirname+'/halo2.txt');

bacaStream.on('data', function(potData){
      console.log('*** Potongan data masuk! ***');
      tulisStream.write(potData);
})
```

*Akan muncul file *halo2.txt* yg kontennya Sama dengan hasil pembacaan *halo.txt*

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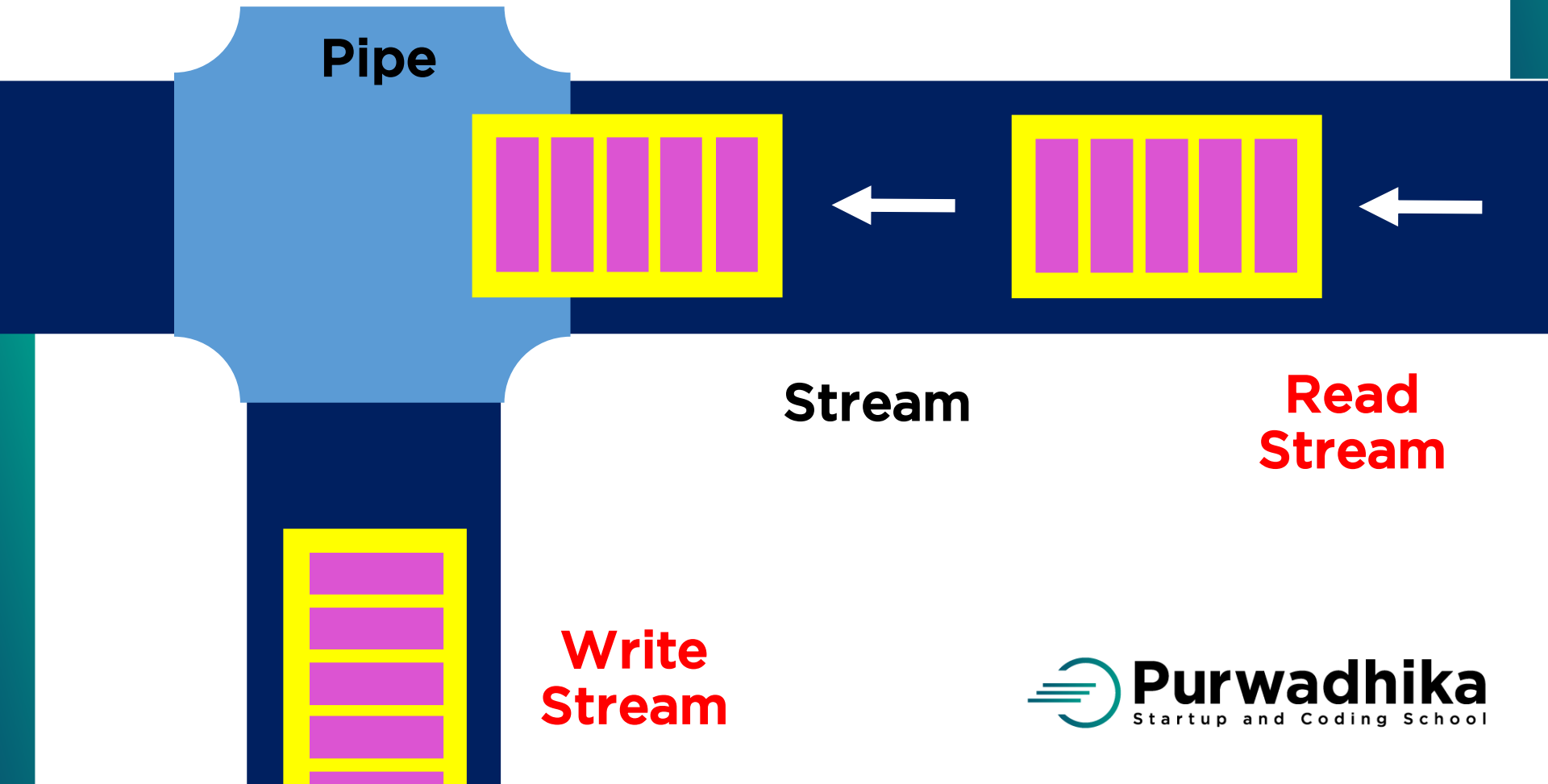
Pipe

- Pipe takes data from a read stream and then “pipe” into a write stream.



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FS Read & Write Stream

```
var fs = require('fs');

var bacaStream =
fs.createReadStream(__dirname+'/halo.txt','utf8');

var tulisStream =
fs.createWriteStream(__dirname+'/halo2.txt');

bacaStream.pipe(tulisStream);
```

*Akan muncul file *halo2.txt* yg kontennya
Sama dengan hasil pembacaan *halo.txt*

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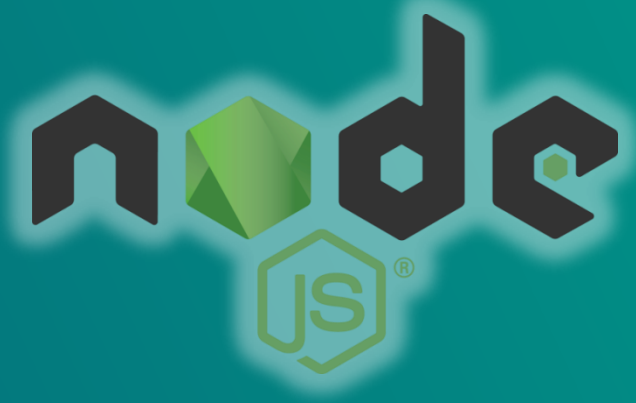
Back-End Development

Exploring



#2 Built-In Module

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